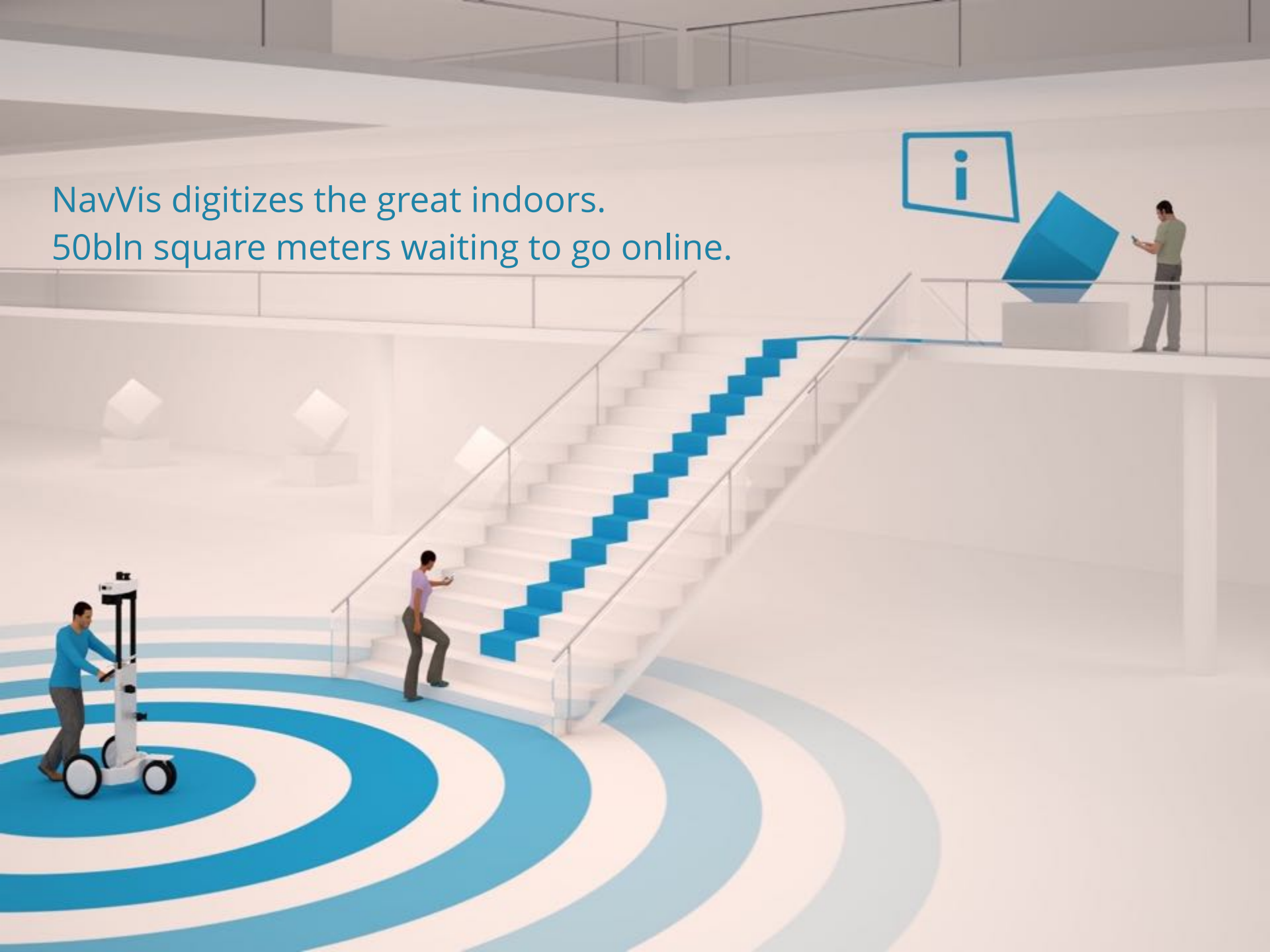


NavVis

Digitizing the indoors

March 2016

NavVis digitizes the great indoors.
50bln square meters waiting to go online.





Market



Product



Customer Value



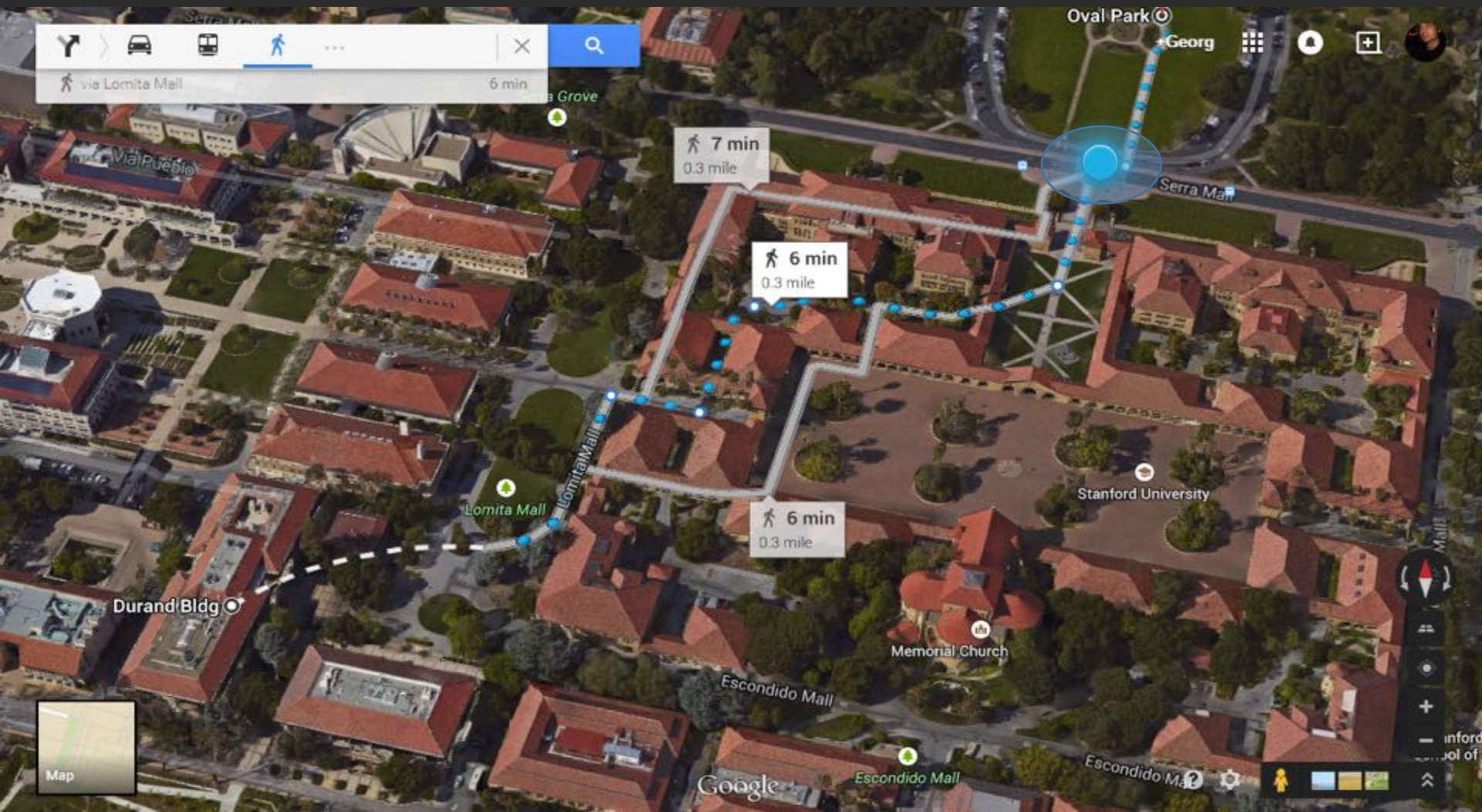
Business Model



Company

Outdoor is digitalized almost entirely

... allowing us to access detailed 3D maps and GPS based positioning anywhere on any device: the basis for all location based services.



While the great indoors are still offline

Indoor space – one of the most valuable, highest utilized goods – is 90% offline today. The best maps we get indoors are typically fire escape plans

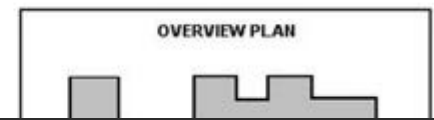
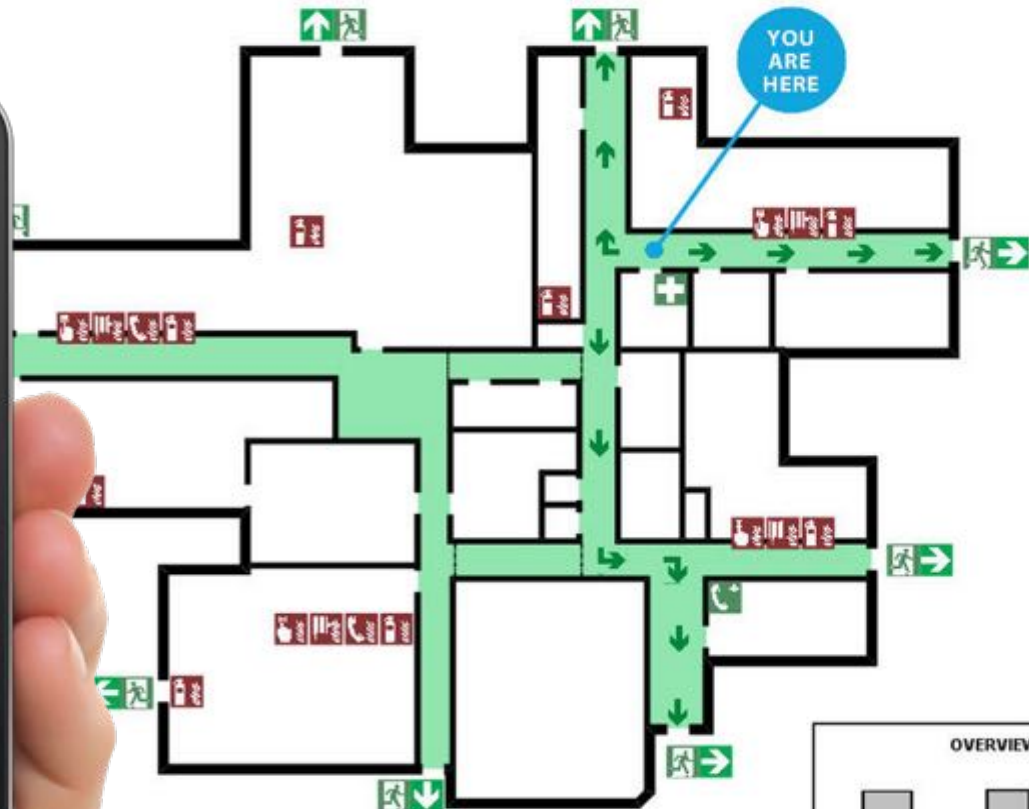
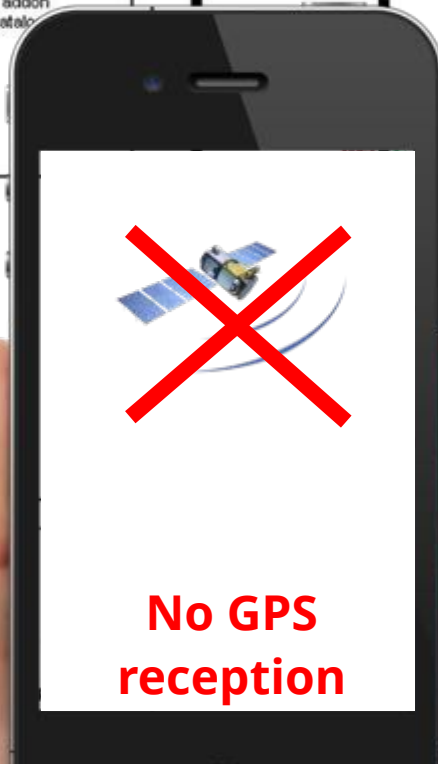
FIRE ESCAPE PLAN

Ground Floor

SAFETY NOTICE

This drawing is based on the example found in BSI ISO 23601

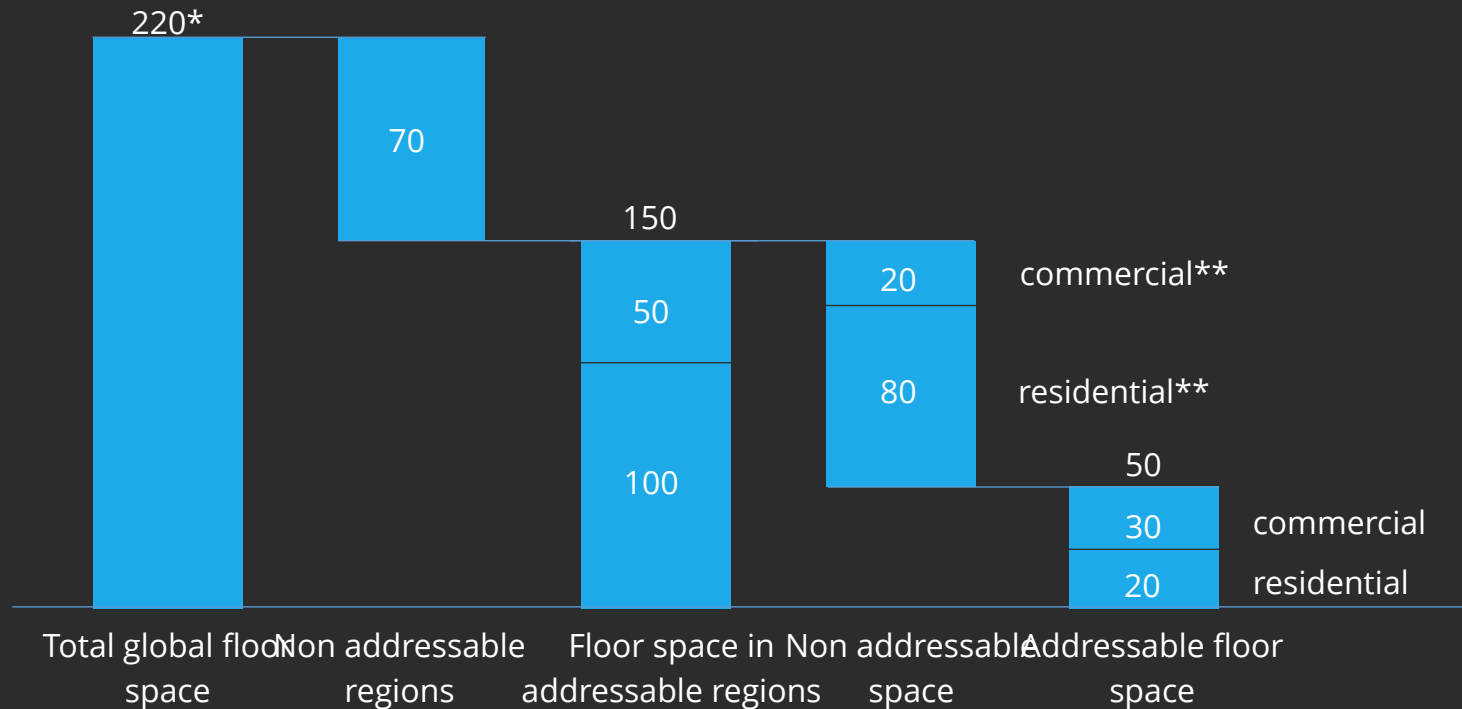
It was created using Visual Building Basic and an add-on Fire Escape symbol catalog



Indoor space will go digital

Outdoor space is digitally captured and easily available on all our devices today. Economically even more valuable indoor space – counting in billions of square meters – is still a digital wasteland.

Global total addressable market 2020 (m²)



* Statistical data provides a wide range of estimations of global floor space from m² 150 bn to 300 bn globally

** Non addressable commercial space refers to (very) small shops / office space; non addressable residential space refers to small to medium sized private space



Market



Product



Customer Value



Business Model



Company

Next-level Indoor digitalization



M3 Trolley

Map complete buildings in hours at an unmatched cost/quality ratio



IndoorViewer

Access your digital building from anywhere via our browser-based IndoorViewer



Navigation App

Get your location - meter accurate and without the need for new infrastructure (computer vision based)



M3 Trolley

Capture Indoor environments with panoramic images and 3D point clouds.

- Indoor digitalization at scale – cut the cost per m² by factor 100
- Scan the environment with the integrated laser scanners in a range of 30 meters
- Create inch-perfect 3D environments
- Capture high resolution panoramic images for a brilliant visual quality
- Easy and intuitive to use – only minimal training is required

M3 Trolley



6 high resolution
system cameras

Touch screen: just press
record and start mapping

3 high resolution long range
laser scanners

Stable yet lightweight alloy chassis
made for everyday work

IndoorViewer

Explore and interact with the virtual environment – integrate interactive features.

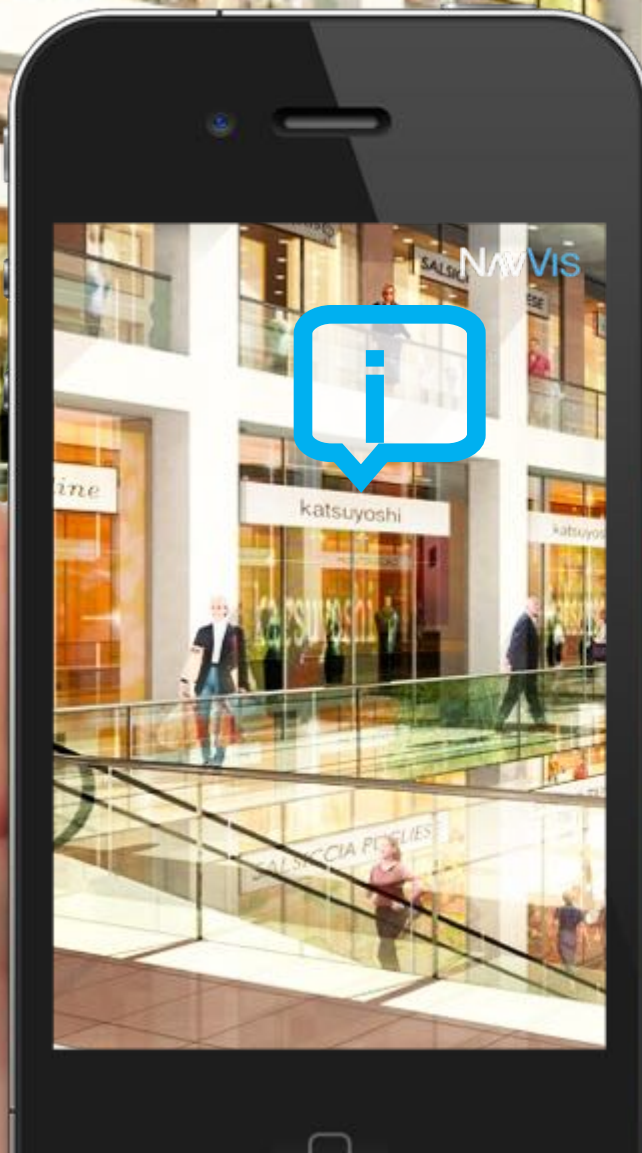
- Browser-based viewer to access and explore your buildings in 3D on any device
- Interact with points of interest and connect them to real-world objects
- Powerful API to integrate IndoorViewer into your SAP, facility management tools, or any other existing infrastructure
- Measure distances and volumes
- Share your location and points-of-interest via Mail or Facebook

Test

NavVis App

Indoor Navigation taken to the next level – meter-accurate, view angle sensitive and without infrastructure.

- First indoor navigation app that does not require infrastructure
- Meter-accurate thanks to patented computer vision based algorithms
- Highly scalable due to extremely low set-up costs
- Instantaneous localization – saves battery and nerves!
- Virtual reality interface for easy orientation
- An ecosystem for 3rd party location-based services





Retail



Facility Management



Office Management



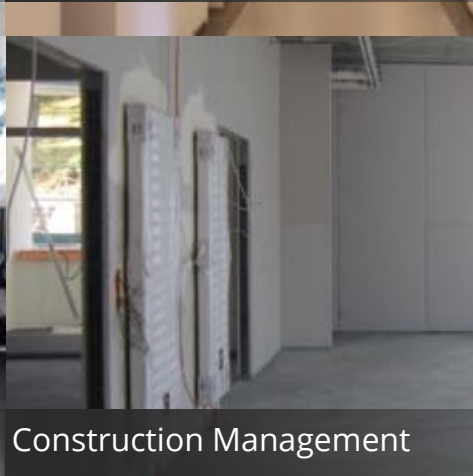
Transportation Hub



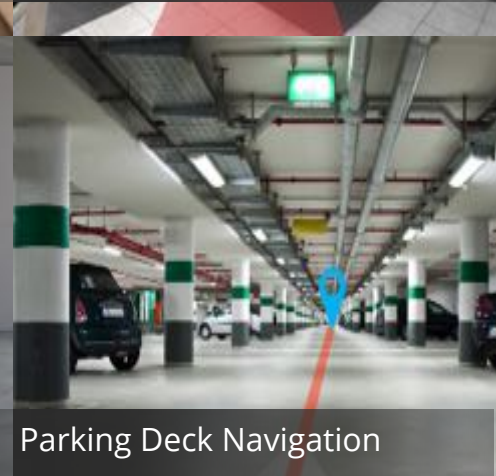
Real Estate



Exhibitions



Construction Management



Parking Deck Navigation



Logistics



Insurance



Production planning

...



Market



Product



Customer Value



Business Model



Company



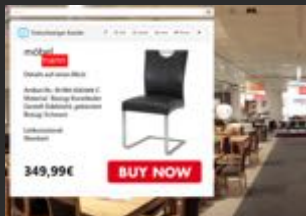
Virtual Showroom

Expand real-world retail space with a virtual shopping universe – affordably and easy



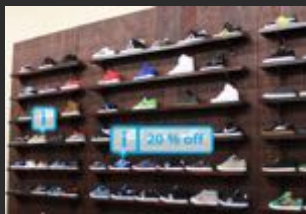
One room – many looks

Multiply floor space without additional costs: present different product portfolios and inspire your customers



Virtual Shop

Increase sales with innovative virtual-shop concept



Information and Incentives

Target customers and inform about events, provide additional details and offer new deals



Your benefit

- Generate interest with a novel shopping experience
- Convergence of online & offline – smoother and easier than ever before
- Profit from low costs and simple setup
- Integrate retail space into online presence

The technology

- Digitalize retail space – photorealistic with the NavVis M3 Trolley. Up to 50,000 m² per day
- Fully automated export to the web
- Discover the virtual showroom – easy and without fuss – right in your browser

One room – many looks

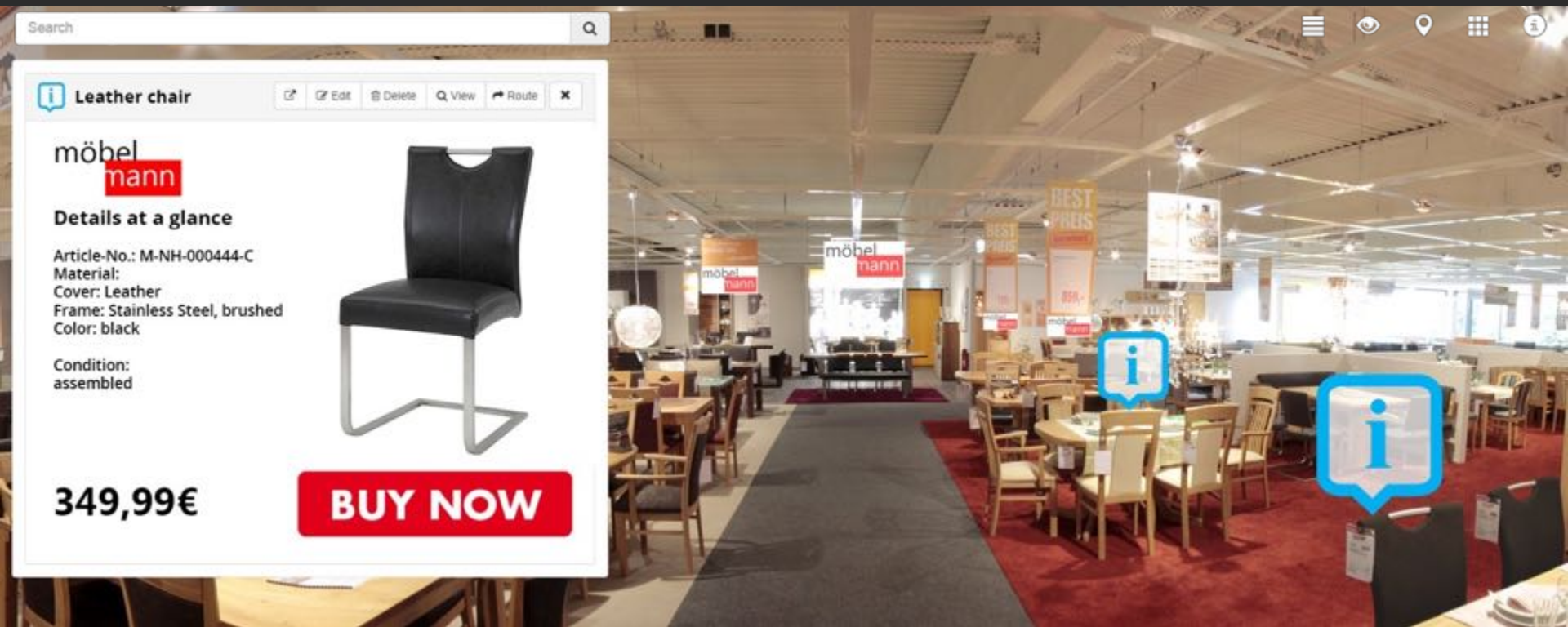


Your benefit

- Multiply retail space online
- Present the full variety of products
- Inspire customers with different design ideas
- Easy A/B-Testing possible

The technology

- Rescan your store with new products or a different look
- Fast & easy update of rearranged rooms
- Preserve previous store arrangement online

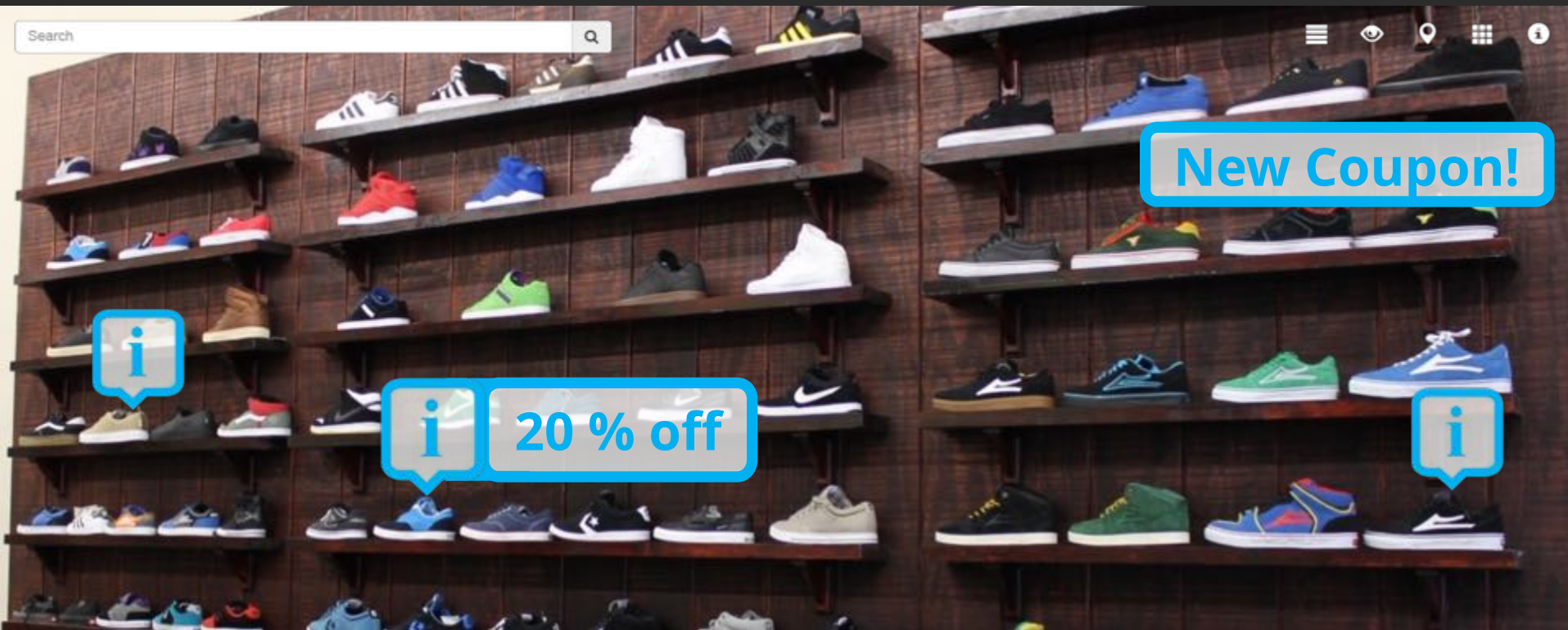


Your benefit

- Best of both worlds: Combine the advantages of offline- and online-shopping
- Boost turnover with a vivid online shopping experience
- Present products in a realistic environment
- Affordable and easy to implement

The technology

- A small icon above the product indicates: click here
- Connect products in virtual tour directly to online shop
- Add information and multimedia content to products



Your benefit

- Extremely flexible. Ideal for real-time marketing
- Seamless integration into the virtual shop
- Precise targeting possible
- No fuss, low costs
- Higher customer value through personalized offers

The technology

- Icon calls the attention to special offers and deals
- Add information to the virtual world with just a few clicks
- Countless possibilities for interactive features e.g. coupons, reviews and many more

Use Case: Online Facility Management



Documentation

Map and measure vast buildings in a fully detailed 3D-model



Inventory

Tag objects directly in your browser and connect them to your database



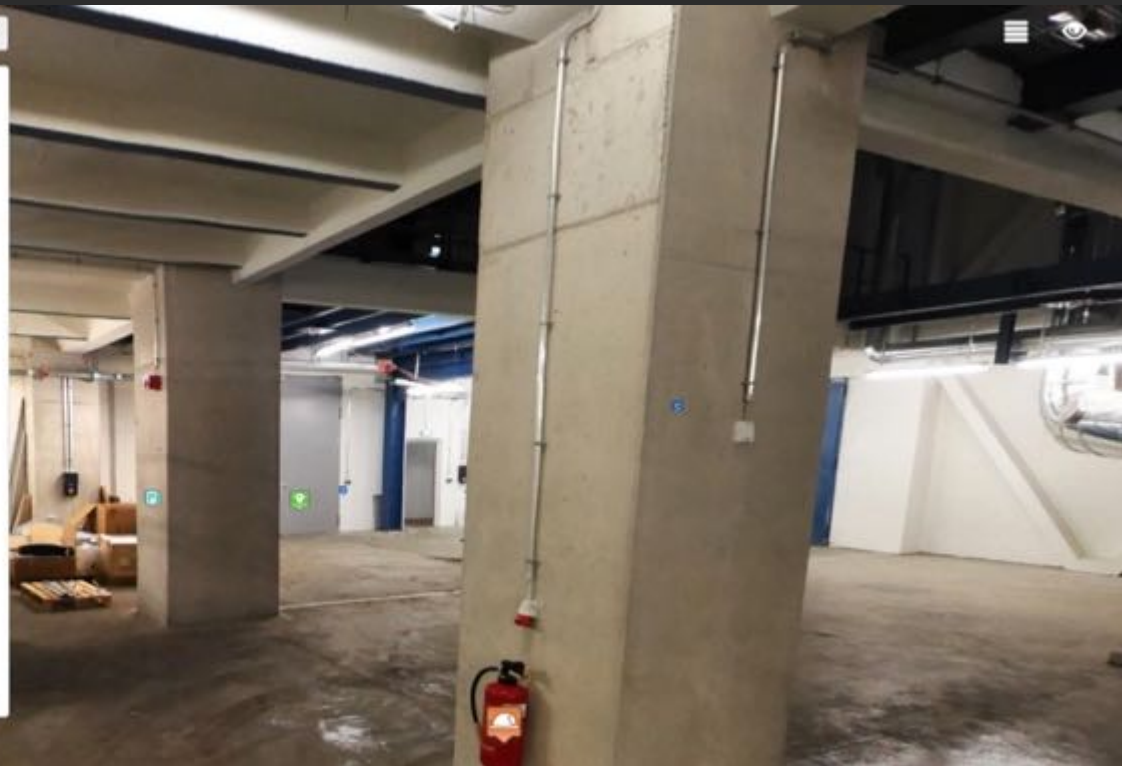
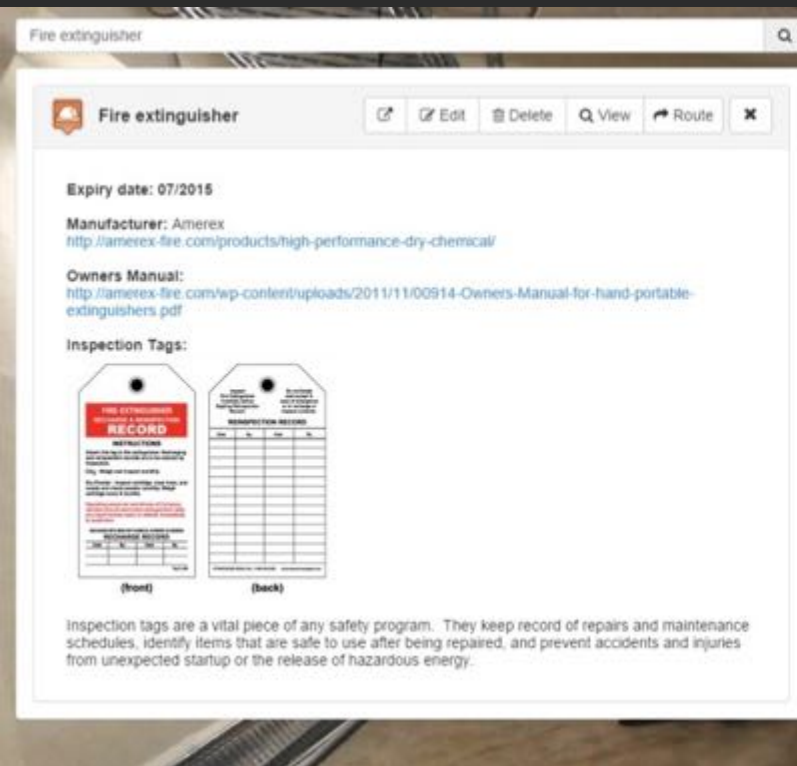
Routing

Navigate through complex buildings with ease and minimize time-wasting



Tasks

Manage maintenance tasks on-site and optimize your workflow with external partners

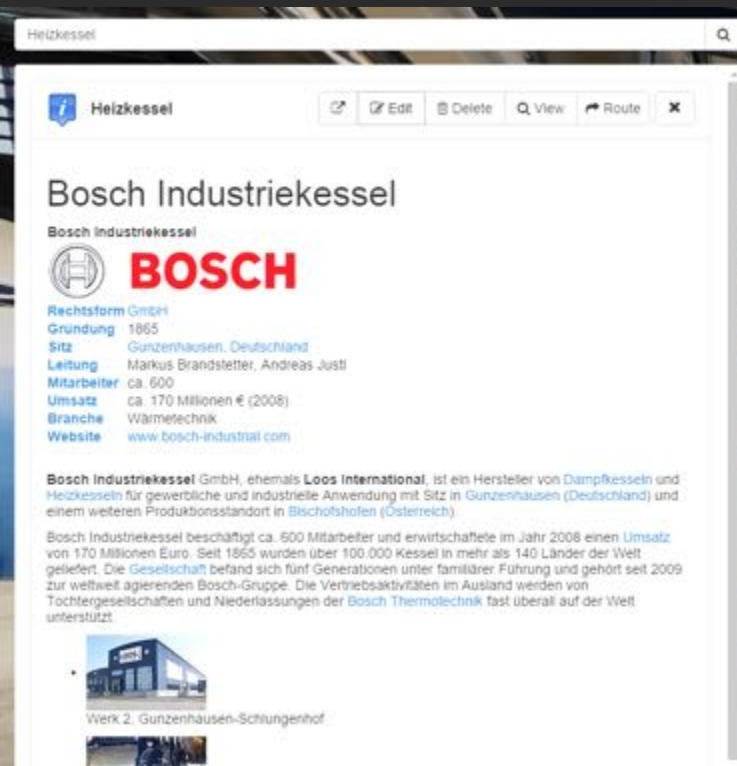


Your benefit

- Fast and easy snapshot of your facility
- Unbeatable cost efficient with up to 50.000 m² scanned per day
- Various applications including documentation of fire prevention, escape routes or construction progress

The technology

- Virtual image of your buildings, available within your browser
- Photorealistic and inch-perfect modeling
- Fully automatic generation of floor plans, 2.5D views, Wi-Fi coverage and much more



Your benefit

- Only one click from your asset database to the objects location
- Photorealistic view of your assets and their environment for high value
- Superior combination of exact capturing and affordable processes (avoid standstill of your machinery)

The technology

- Online stocktaking directly in your browser
- Attach additional information to an object in the virtual model
- Link your asset database directly to your virtual premises



Your benefit

- Convenient and intuitive routing (3D)
- Reduce expenses through optimized navigation to repair and maintenance tasks
- Display the fastest way to emergency exits or fire alarms

The technology

- Routing takes stairs, furniture and more into consideration
- Full-text search for places and objects in your plant
- Routing information on a general map or directly in your virtual 3D-environment



Your benefit

- Streamline your maintenance and service processes
- Intuitive orientation with high recall value
- Fast locating of maintenance sites
- Easy online planning and task preparation

The technology

- Browser-based one-click creation of assignments directly on the object in question
- Provide explanations, hints or job instructions onsite
- Full-text search for tasks or objects within your browser



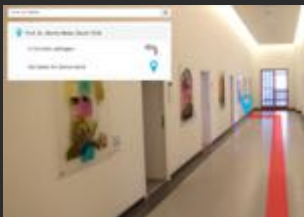
Overview

Embed 2D and 3D models easily in your intranet
– fast orientation in complex buildings



Full-text search

Find people, objects and rooms faster with full-text search
– easy integration with existing information systems



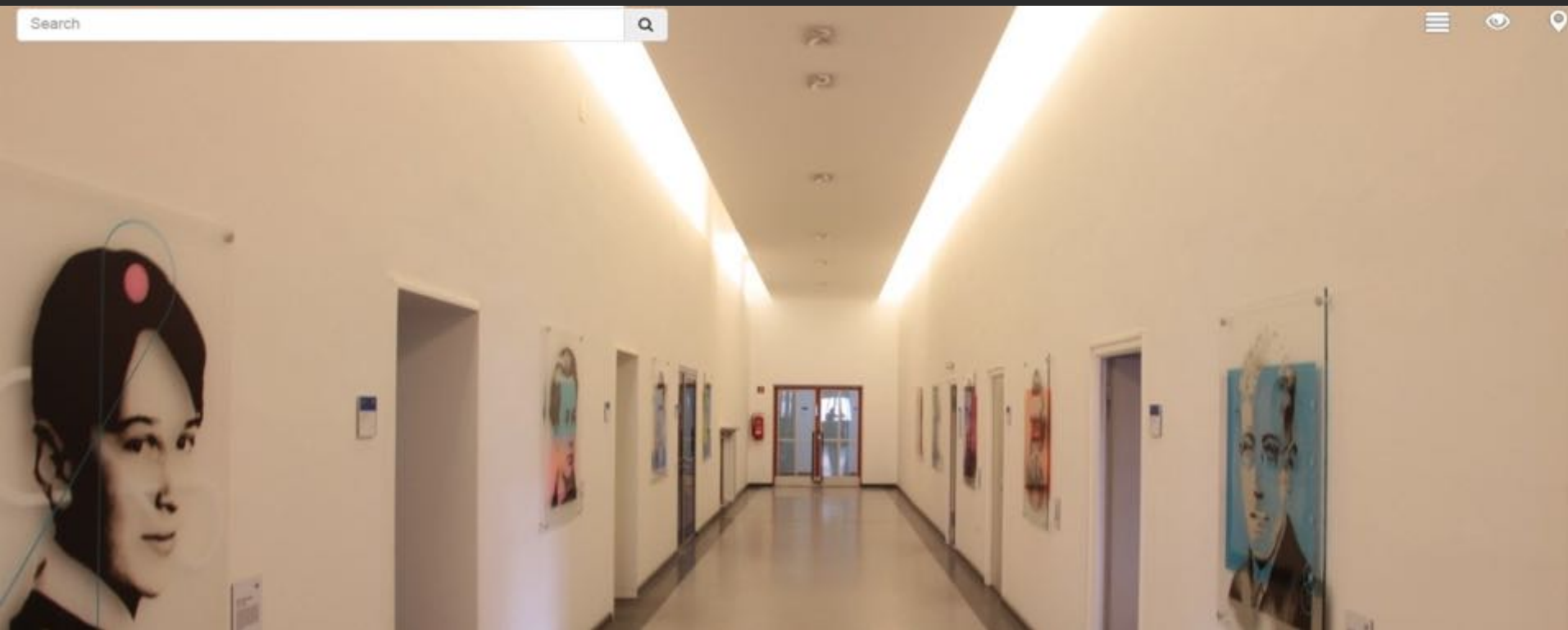
Routing

Photorealistic routing guides to target destinations fast, convenient and time saving



Additional information

Tag objects in the 3D-environment and inform digitally about rooms, devices or enable interactive functions



Your benefit

- Get a quick overview of any building with our 2D and 3D plans
- Improve escape routes and fire drills with photorealistic 3D views
- Accessible for employees, customers and partners in every modern browser (internet or intranet)


The technology

- Ideal for large office buildings. Map up to 50,000 m² per day
- Automated post processing ensures unbeatable prices per m²
- Host the data in your data center – or use the NavVis SecureCloud

Prof. Peters

Prof. Dr. Max Peters

Room: T033



Arrange a meeting

0157/1939367725

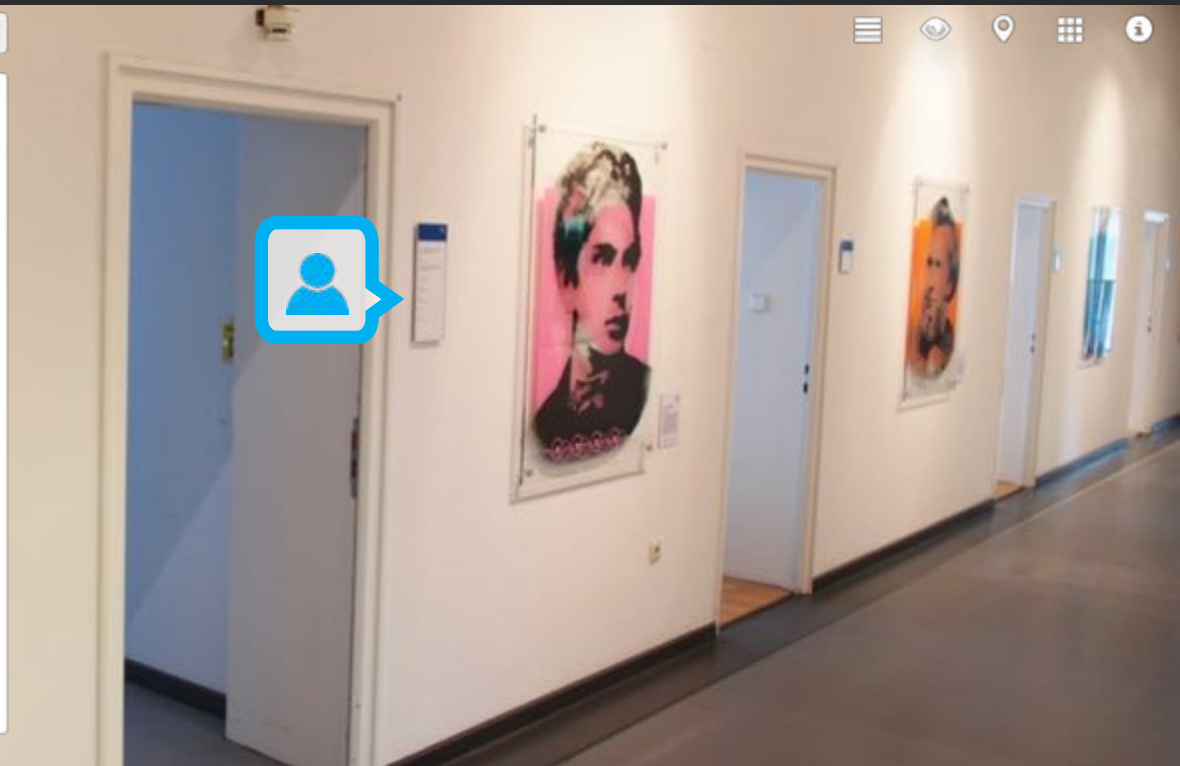
Max.Peters@tum.de

Biology Department

Research areas

- Bacterial Physiology and Biochemistry
- Human Biology and Bio-Imaging

Office hours:
7:30 - 19:45

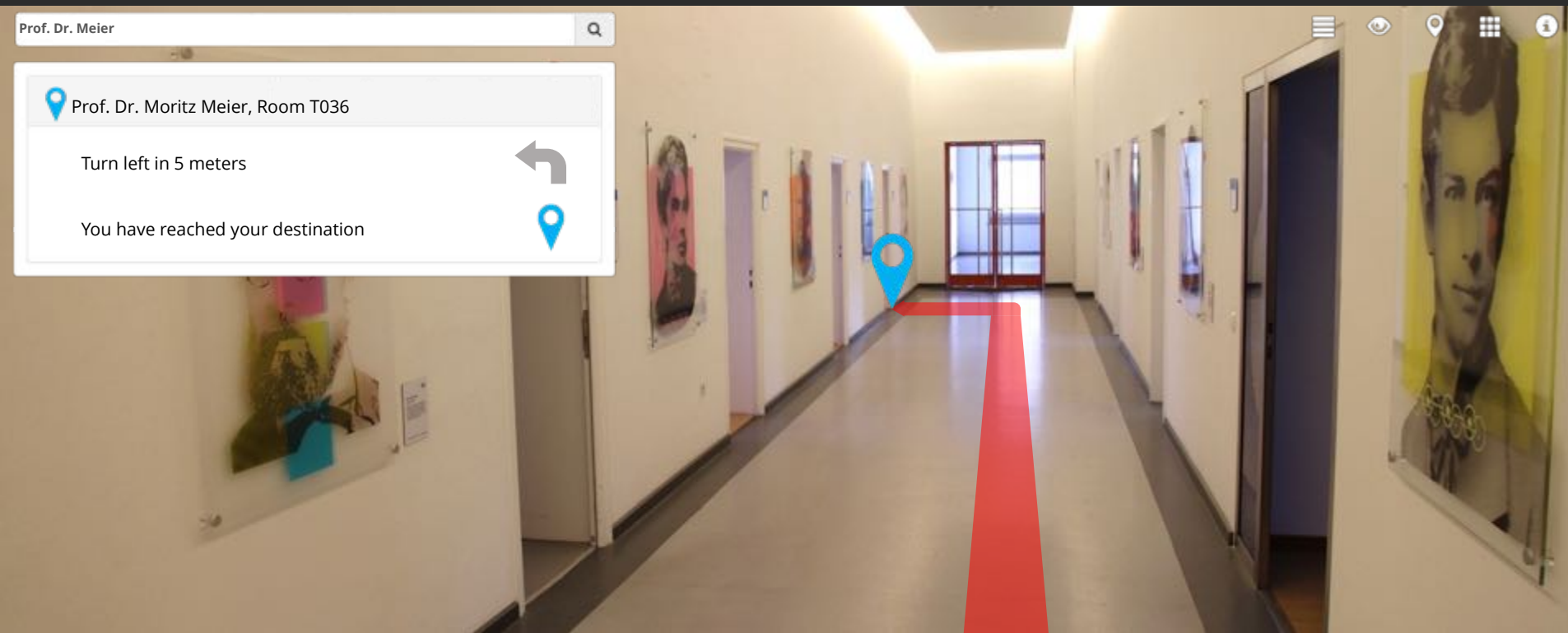


Your benefit

- Add information with just one click: rooms, people, occupation plans and many more
- Safe time with our intuitive full-text search – conveniently in any browser
- Great usability thanks to the ergonomic user interface

The technology

- Full-text search connects all objects with the location in the 3D environment
- Seamless integration into prevailing software systems through open standards and the use of HTML5 technology

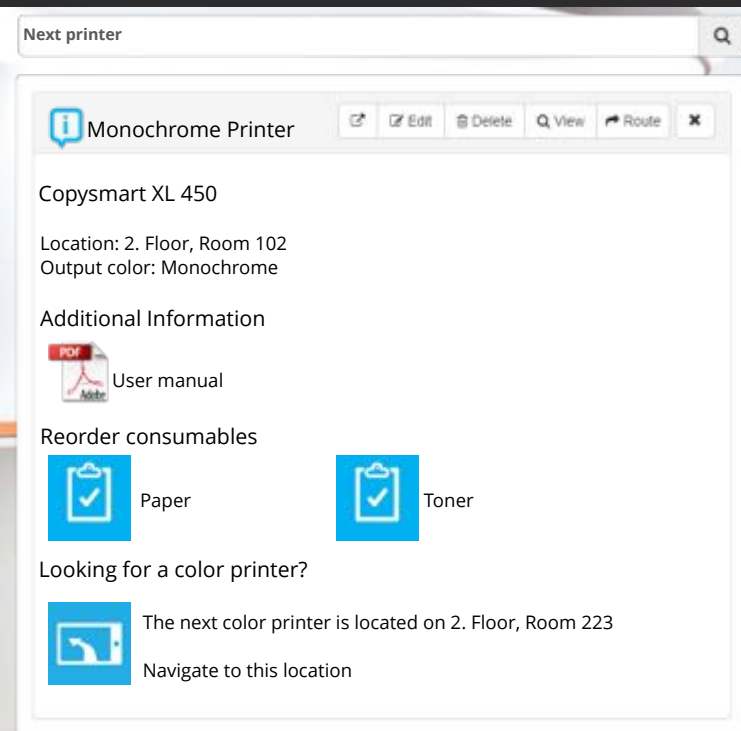


Your benefit

- Avoid the time-wasting search for meeting rooms, floor printers etc.
- Suit human viewing habits with our natural photorealistic 3D virtualization
- Add spatial information to directions – comprehensible and accurate

The technology

- 3D routing across different floors and buildings
- Automated navigation graph respects e.g. handicapped accessible routes
- Visualization in 3D or on a floor plan



Your benefit

- Attach additional information to rooms or objects with just one click: manuals, plans, lists, training materials etc.
- Embed smart interactive features – reorder toner with a click of a button

The technology

- Create Points of Interest (POIs) in a given location – with a simple click in your browser
- Open standards and the use of HTML5 allow complex add-ons and interactive features



Inform in advance

Inform prior to departure and travel more conveniently – available on every device with a modern browser



Floor plans

Get a quick overview with automatically generated, inch perfect floor plans, Wi-Fi maps and many more



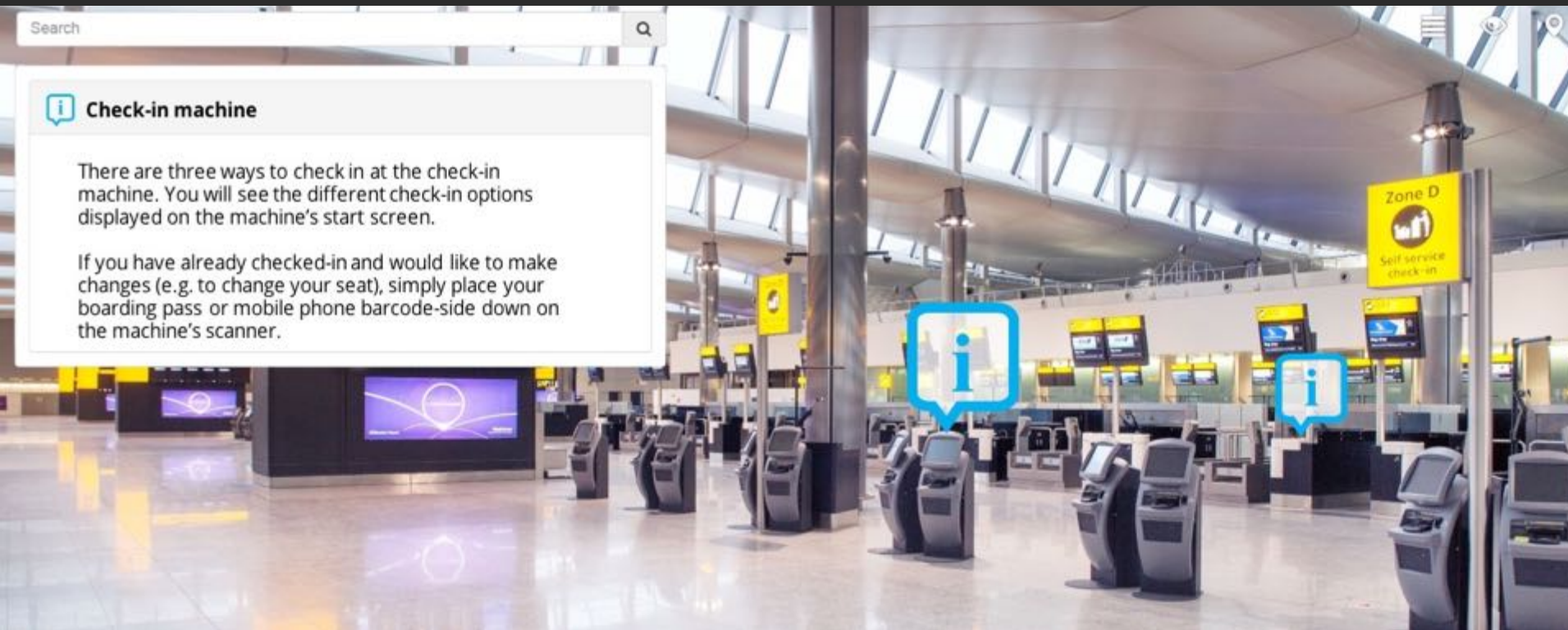
Routing

Photorealistic routing for superior recall value and faster orientation



Interactive features

Integrate interactive features and target customers more effectively

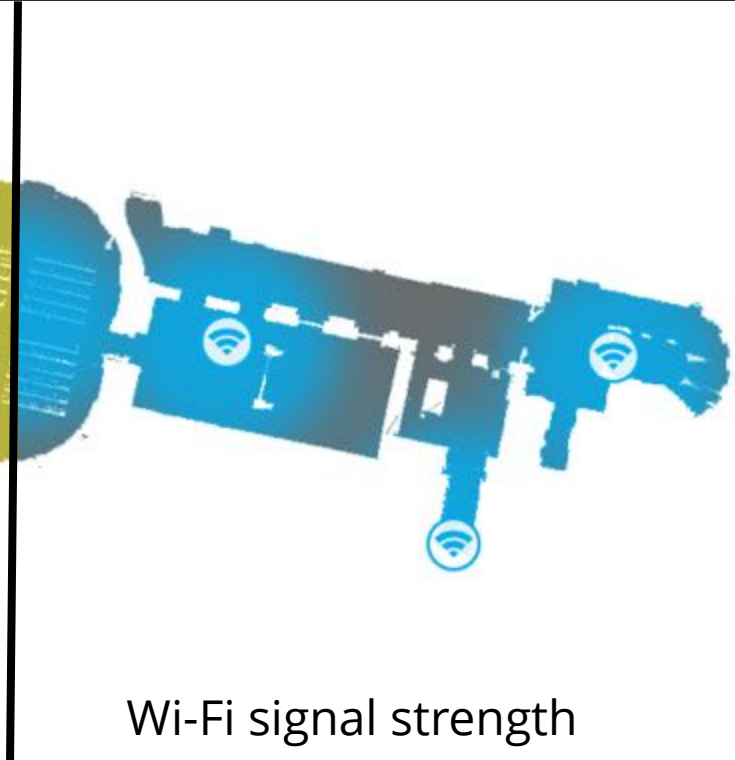
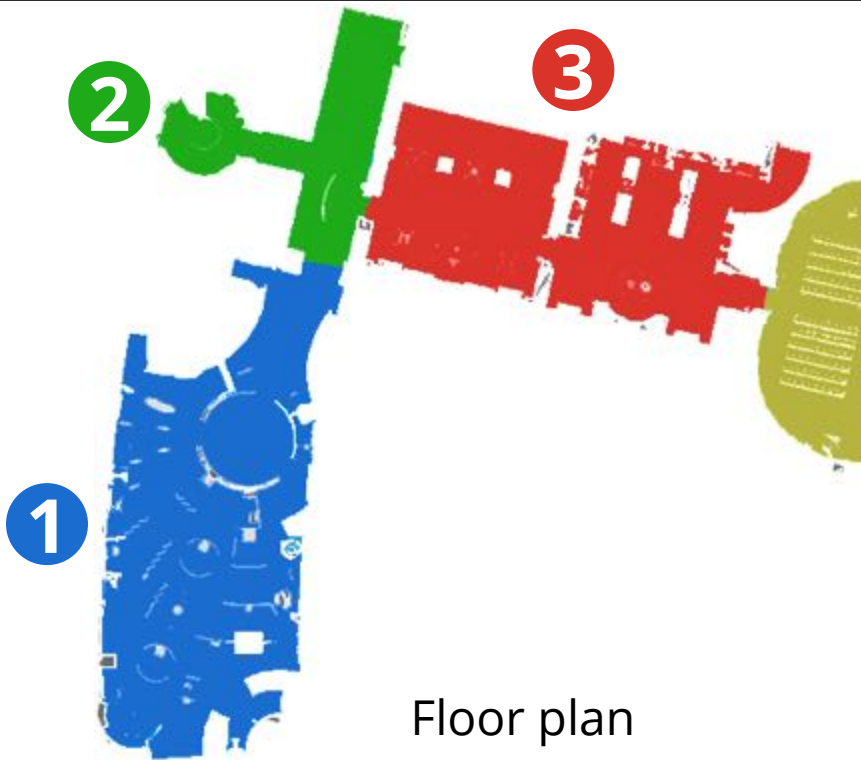


Your benefit

- Inform in advance to save time and travel more conveniently – from the comfort of your home
- Photorealistic environment for high recall value
- More comfort and less anxiety using online walks

The technology

- Map up to 50,000 m² per day – photorealistic and highly accurate at unbeatable prices
- Fully automated export to the web
- HTML 5 technology for universal availability – running on every device with a modern browser

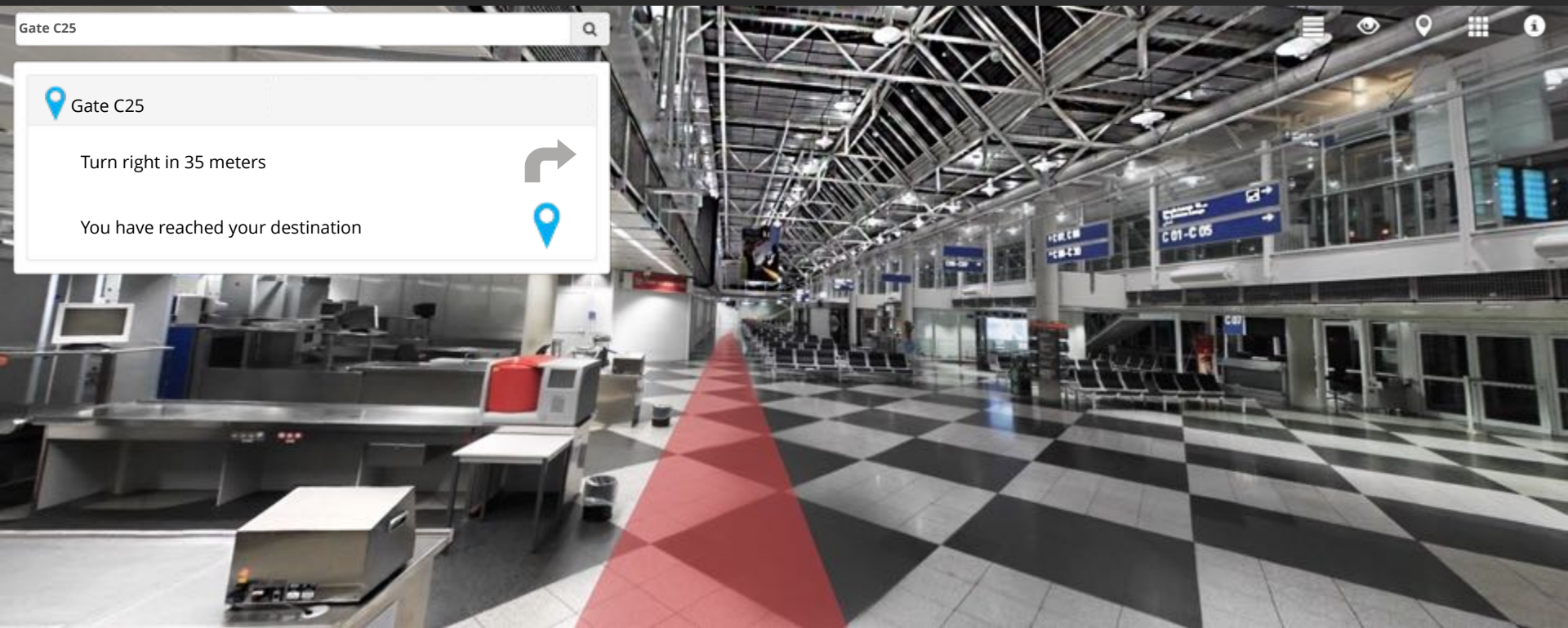


Your benefit

- Fully-automated generation of plans – no fuss and no additional costs for manually generated plans
- Keep building data up-to-date easily and at low cost
- Broad portfolio of information including floor plans, mini-maps, Wi-Fi-coverage and many more
- View plans as a mini-map or in full screen mode

The technology

- The NavVis M3 mapping trolley captures inch-perfect 3D data, high-res panoramas and a number of other parameters (e.g. Wi-Fi, Bluetooth, Magnetic field)
- NavVis patent pending algorithms combine the multitude of sensor information for a remarkable high quality 3D model

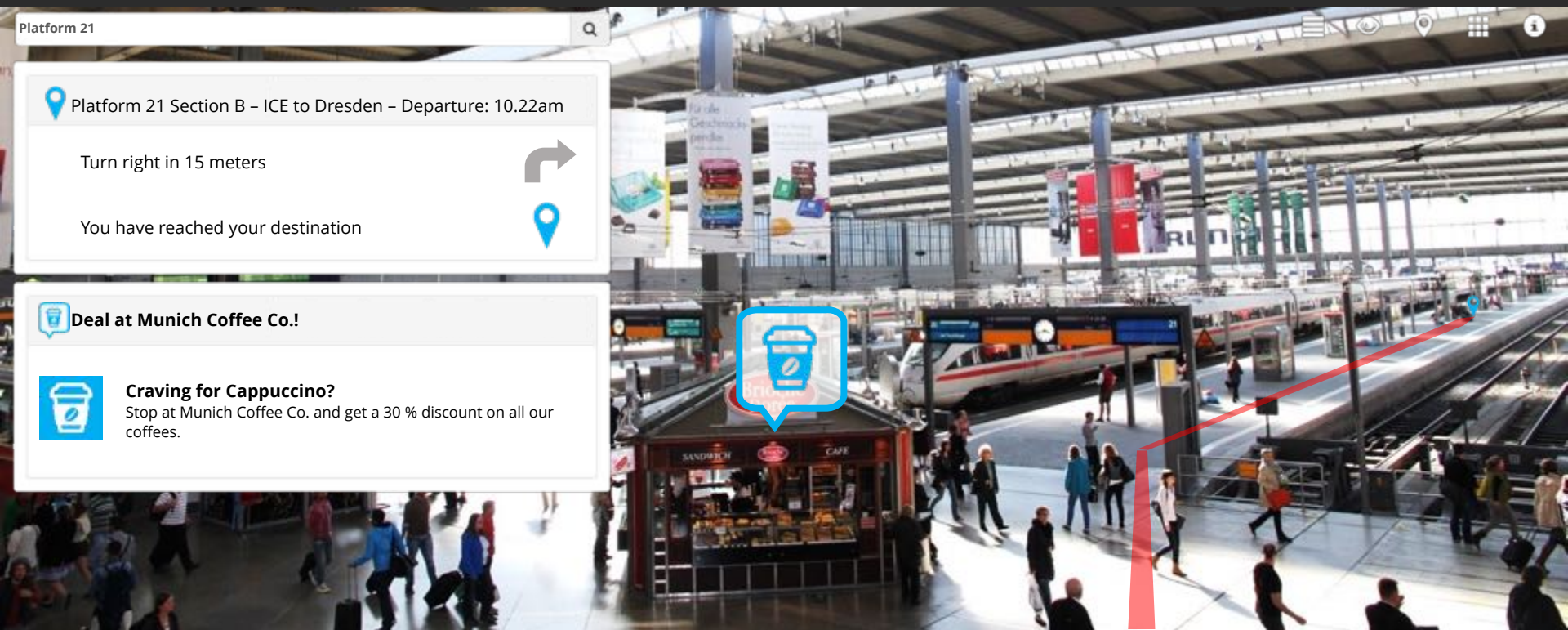


Your benefit

- Easy full-text search of Points of Interest (POIs): find gates, platforms, shops, facilities and many more
- Natural photorealistic 3D virtualization – consistent with human viewing habits
- Jump to a POI directly for a detailed view, display the route in 3D or in the floor plan

The technology

- Routing is based on the automatically created, highly detailed 3D navigation graph (allows different floors)
- Routing takes stairs, ramps and furniture into consideration and allows handicapped accessible routes



Your benefit

- Smart, location based information and features allow a more precise customer targeting
- Wide portfolio of features: offers, up-to-date schedules, social media
- Embed features in the virtual 3D environment – quick and easy

The technology

- Web technologies for easy administration of features
- Manage all information in one place - right in your browser
- Open standards and the use of HTML5 for a seamless integration into existing systems



Construction documentation

Holistic and complete capture of construction sites – quick and easy



Construction progress

Track the progress of your site at different stages – available online for full traceability



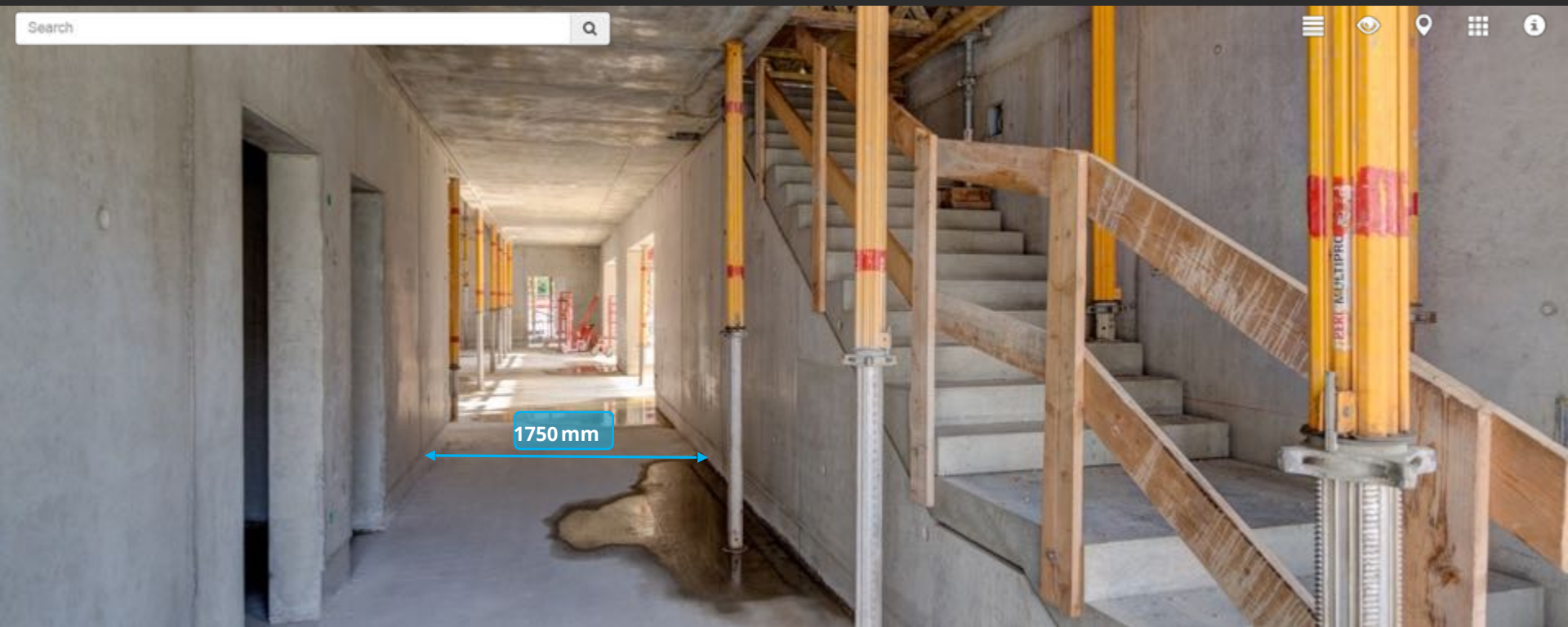
Online collaboration

Share your building online – discuss, collaborate, create transparency



Additional features

Attach information directly online – fast and easy, right in your browser

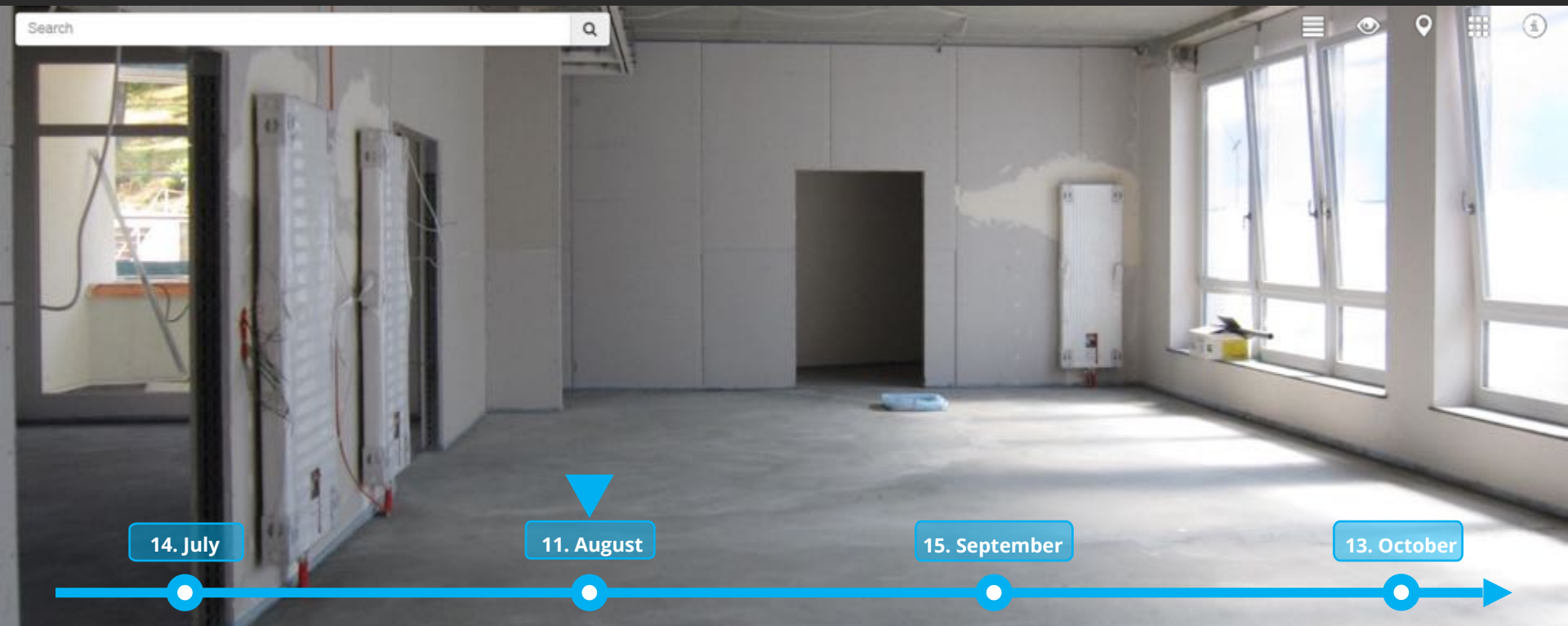


Your benefit

- Photorealistic 3D-model of the building for a highly accurate documentation
- Inch-perfect measuring – directly in your browser
- Capture even the largest structures quick and easy – up to 50.000 m² per day

The technology

- HTML5 technology allows a full cross-platform support – access the data from your PC, tablet or smartphone
- Automated generation of floor plans and layouts
- Seamless integration into prevailing software systems through open standards

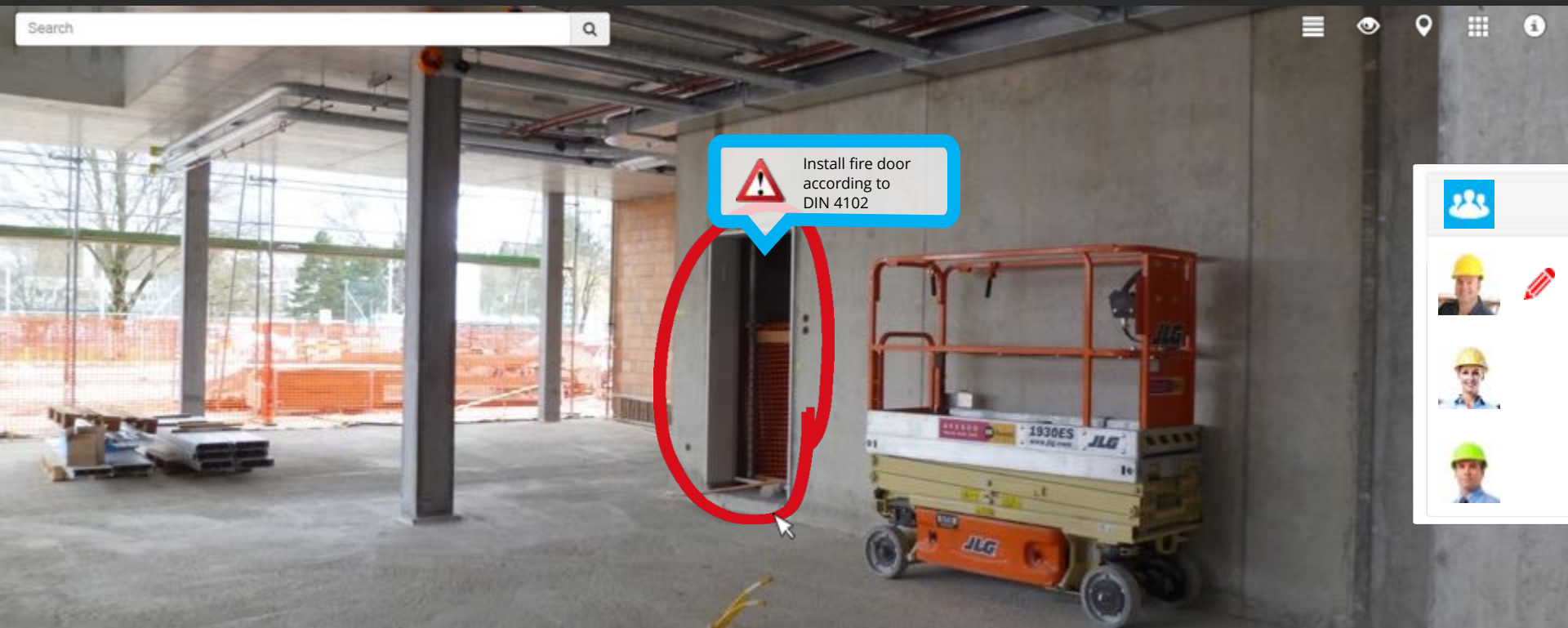


Your benefit

- Scan in different project stages to establish a chronological traceability
- Inspect the site at various points in time – right in your browser
- Easy project management – track progress and identify sources of error

The technology

- Map up to 50,000 m² per day – photorealistic and highly accurate
- Access the data in every modern browser – no additional and expensive software required
- Annotate and attach information right in the 3D-model

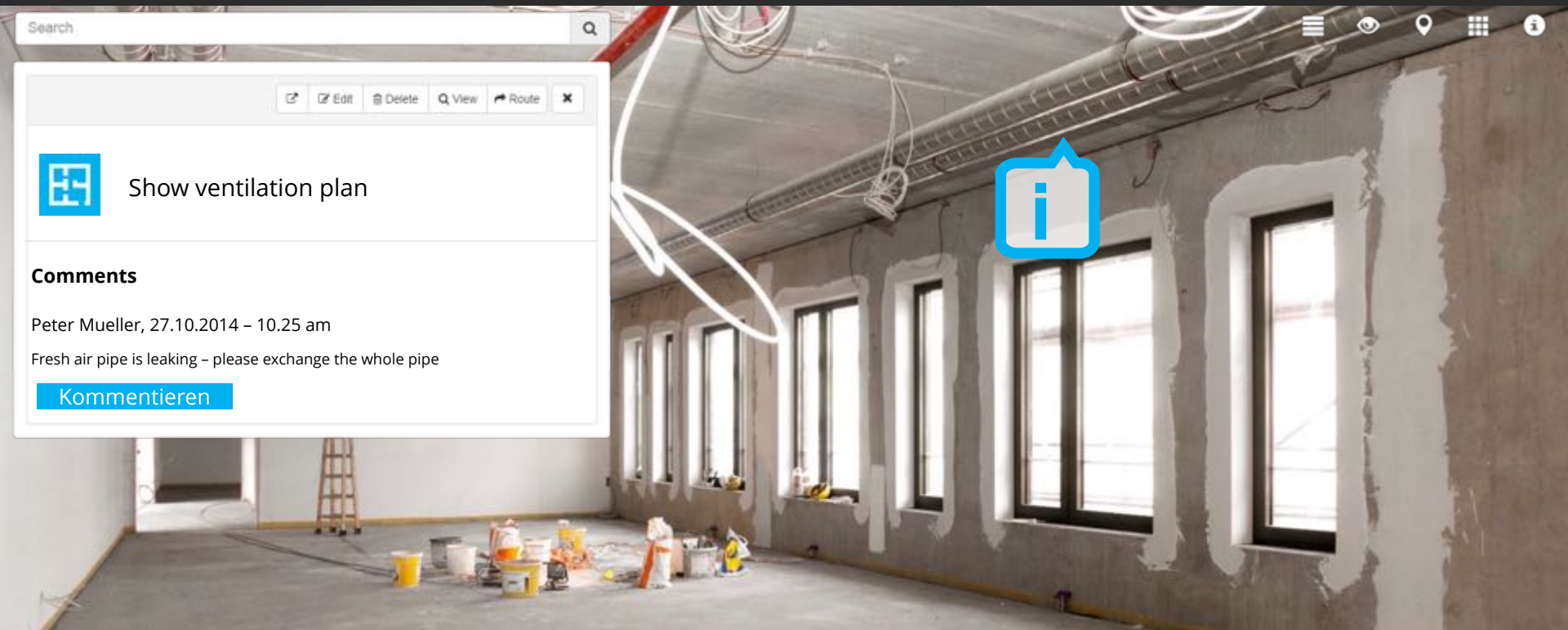


Your benefit

- Share your current scene or start a virtual site inspection to avoid misunderstandings
- Jump to the desired spot instantly – in your Intranet or online
- Streamline processes and optimize the ramp-up of new project partners

The technology

- Photorealistic environment for a superior recall value
- Full data ownership – decide on your own who's getting access to your data
- Host the data on your own server or use the secure servers at NavVis



Your benefit

- Information at the object in the 3D-model helps to avoid misunderstandings and errors
- Important information is available right on site
- Include interactive features like a repair ticketing system with integrated status documentation

The technology

- Add information, data or interactive features with just a few clicks
- HTML5 and open standards allow an easy integration of data and features e.g. pictures, floor plans, instructions and many more



Digital booth

Capture the exhibition in high definition and present it right in the browser



Electronic exhibition ticket

Present the highlights online and acquire new customers



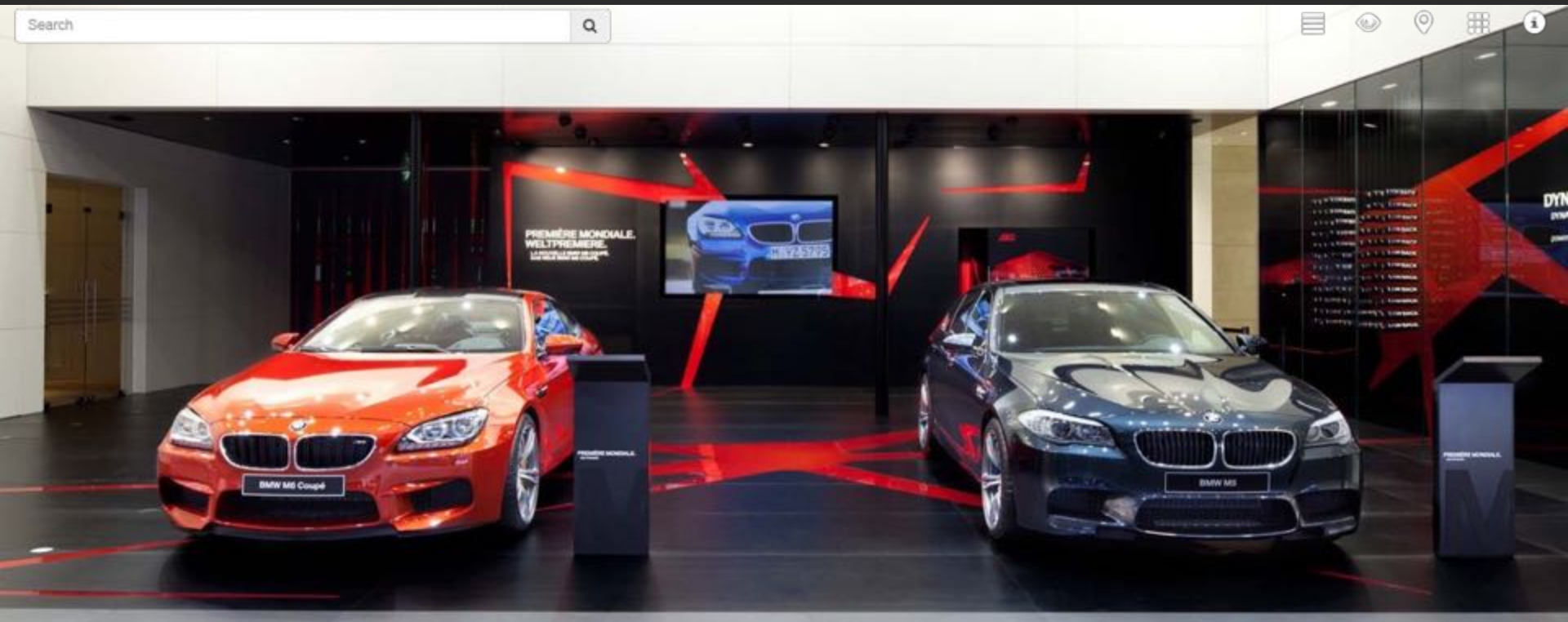
Routing

Guide your visitors faster and easier than ever before



Interactive exhibition

Attach additional information and interactive features to exhibits and enhance the visitors experience

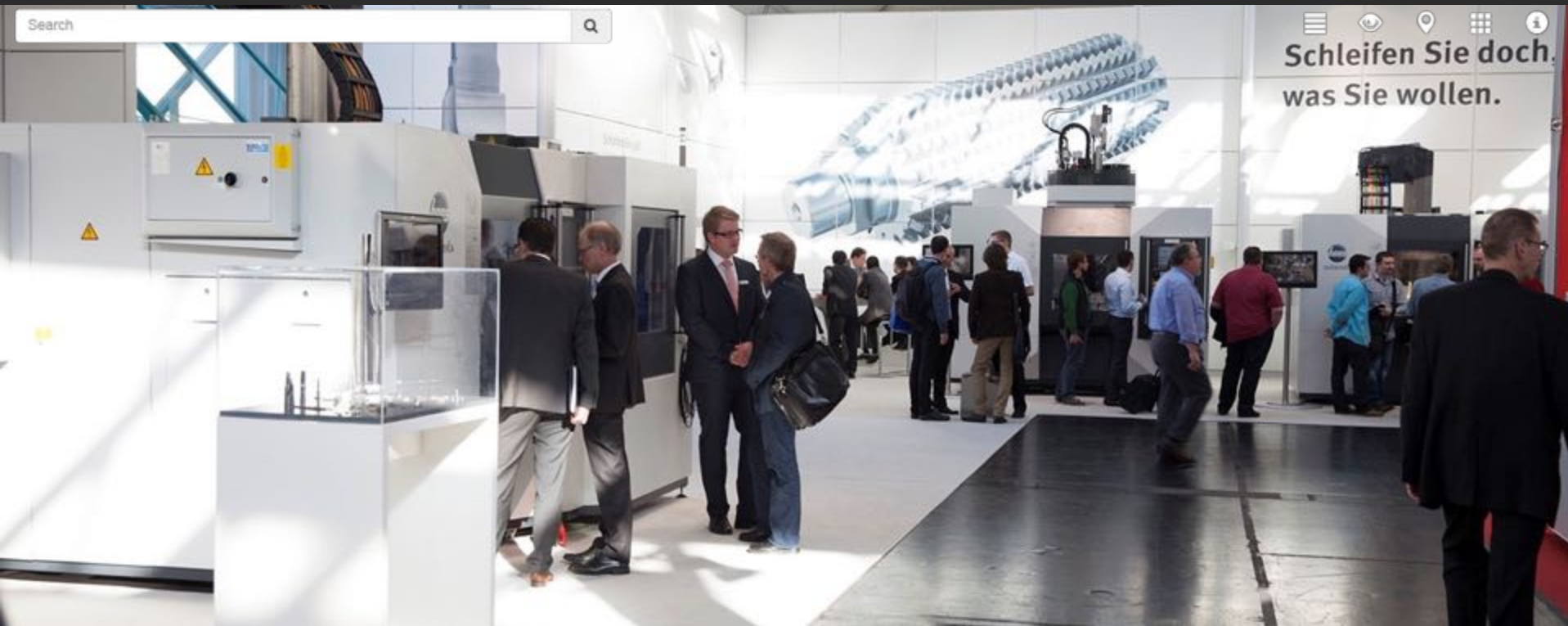


Your benefit

- Use your digital booth for presentations, trainings and many more
- Exhibitors can present the high definition scan on the intra-/internet
- Capture the exhibition and make the virtual booth available – even after the last day of the event

The technology

- Scan up to 50.000 m² per day with a single trolley – photorealistic and highly accurate
- 6 high resolution system cameras with a overall resolution of up to 96 megapixel
- HTML5 technology – available on every device

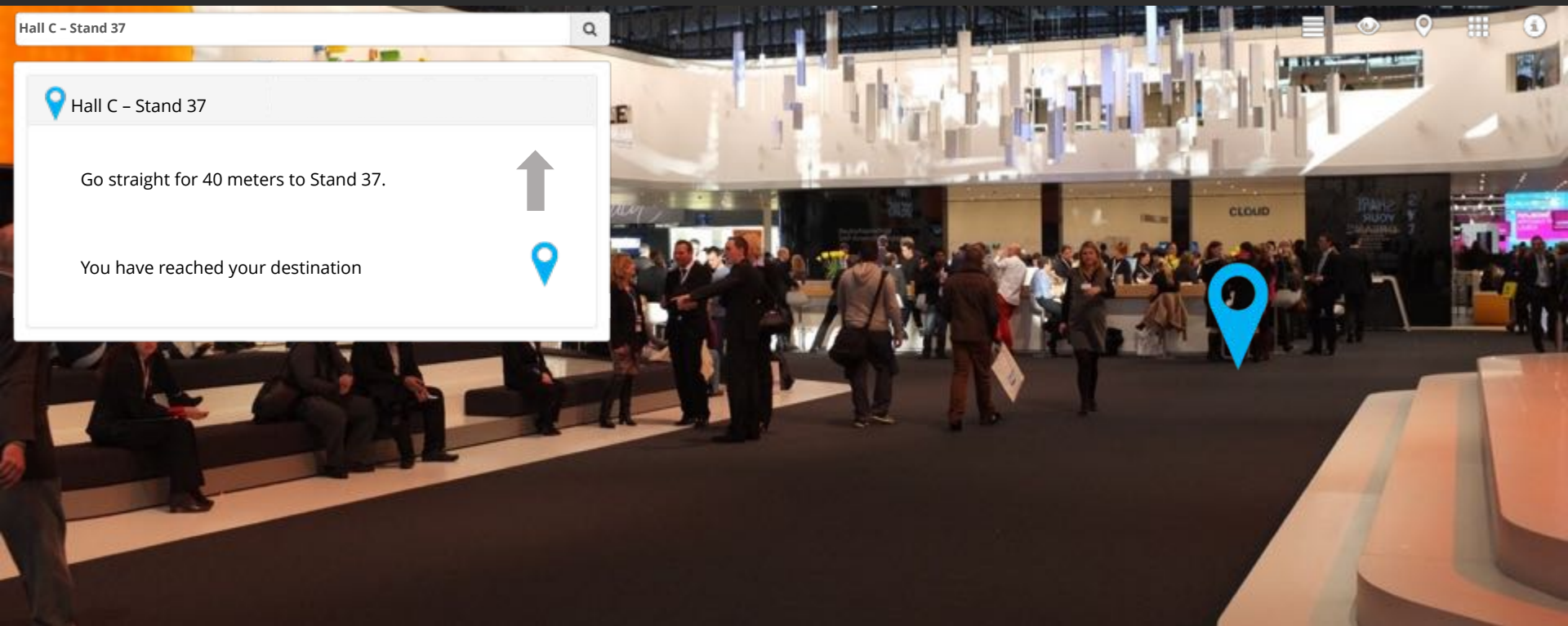


Your benefit

- Present the highlights online and attract more customers
- Virtual tour for current visitors or to attract new visitors
- Explore the exhibition worldwide and at any given time – even after the end of the event

The technology

- User management to reliably manage the access rights to the data
- HTML5 for a multi-platform support – works on any PC, tablet or smartphone
- Fully automated export to the web




Your benefit

- Intuitive orientation with high recall value – based on the photorealistic environment
- Guide your visitors faster and more conveniently – at the exhibition on every smartphone or tablet
- Visitors can explore the exhibition from the comfort of the hotel room

The technology

- No additional infrastructure required
- Robust routing powered by visual features and sensor fusion – everywhere in the exhibition
- Instructions in a photorealistic 3D-view or on the floor plan


TS 15 Wet & Dry Vacuum



Description

The TS 15 Wet & Dry Vacuum is made out of strong high impact resistant plastic, making it ideal for use in any commercial area. The TS 15 is quiet but powerful - the high-performance 1300W motor ensures great suction. The large 15L capacity means you spend less time emptying the vacuum. The TS 15 is easy to use and store and is extremely versatile as it can clean up both wet and dry messes... [more](#)

Product video



Technical details

Airflow rate (l/s)	61
Vacuum (mbar/kPa)	244/24,4
Capacity (l)	15



Your benefit

- Interactive content creates an innovative and exciting experience for the visitors
- Attach product information, pictures, videos and other content directly to the exhibit
- Target visitors more precisely with individualized offers and deals

The technology

- HTML5 and open standards allow the seamless integration of content – pictures, videos, manuals, etc.
- Create Points of Interests (e.g. products, exhibits, booths) fast and conveniently with our intuitive web interface



Presentation

Offer virtual real estate inspections – fast, cost efficient and with a maximum of credibility



Annotation of Detail

Present highlights in the 3D environment and provide additional information with POI's



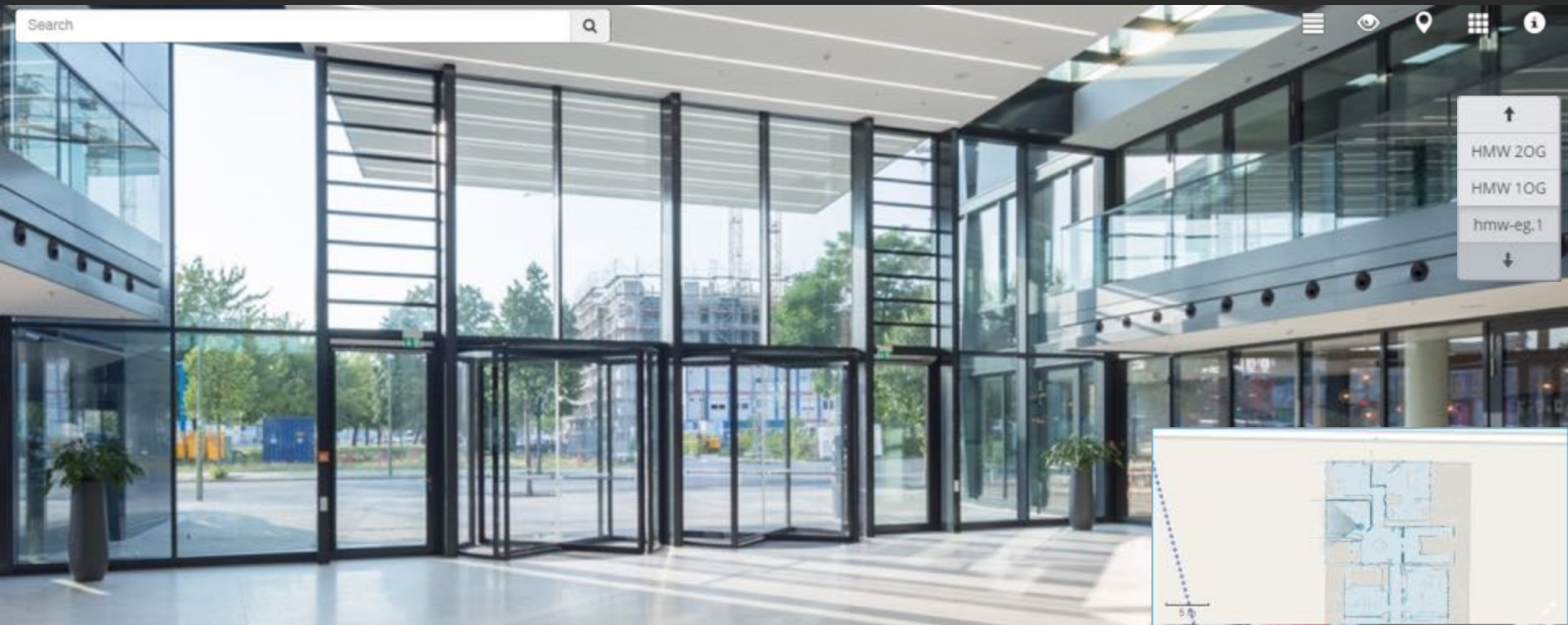
Interior Architecture

Preview possible options of interior design



Design & Planning

Plan accurate and inch-perfect measurements in the real world environment

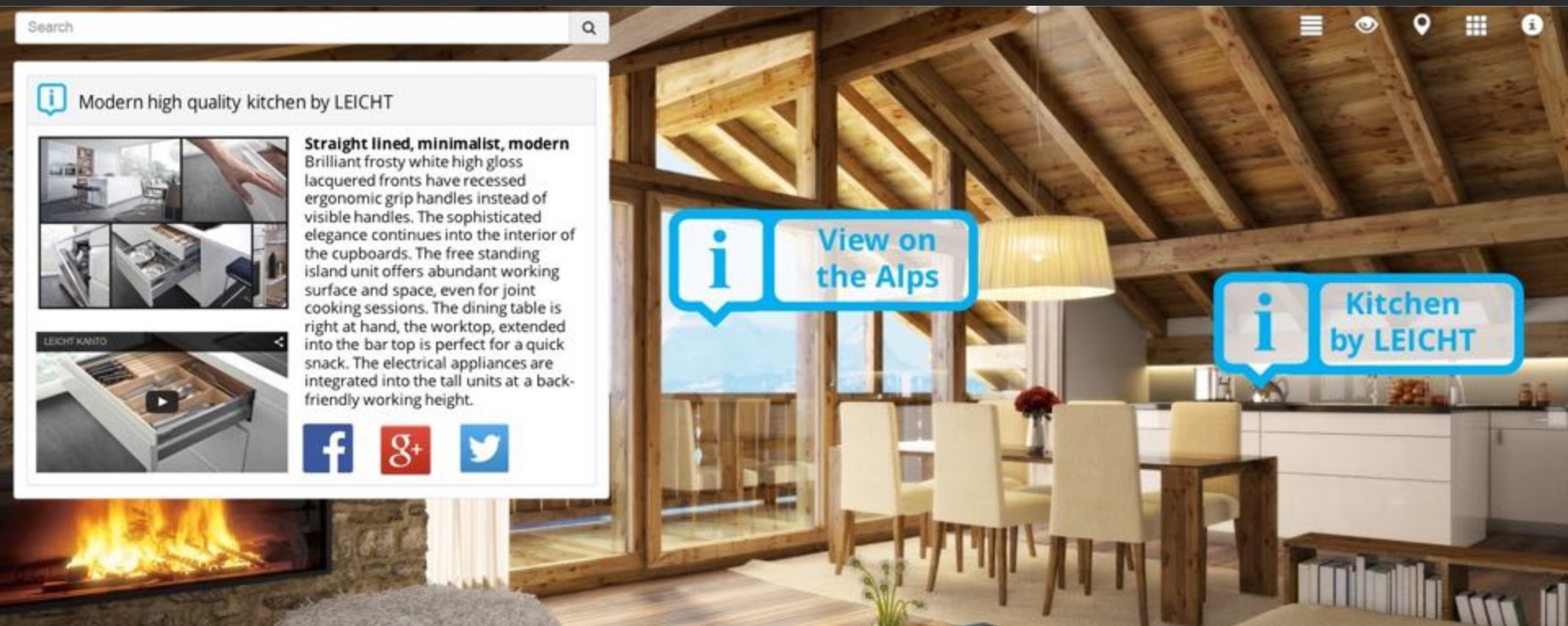


Your benefit

- Portray the entire building authentically
- Fast and cost efficient real estate inspection – offer a virtual tour to get a first impression
- Save time and money by cutting the number of on-site visits

The technology

- Explore the 360° environment and discover the whole building
- Host the 3D model online and provide a real estate tour 24 / 7 and on any device

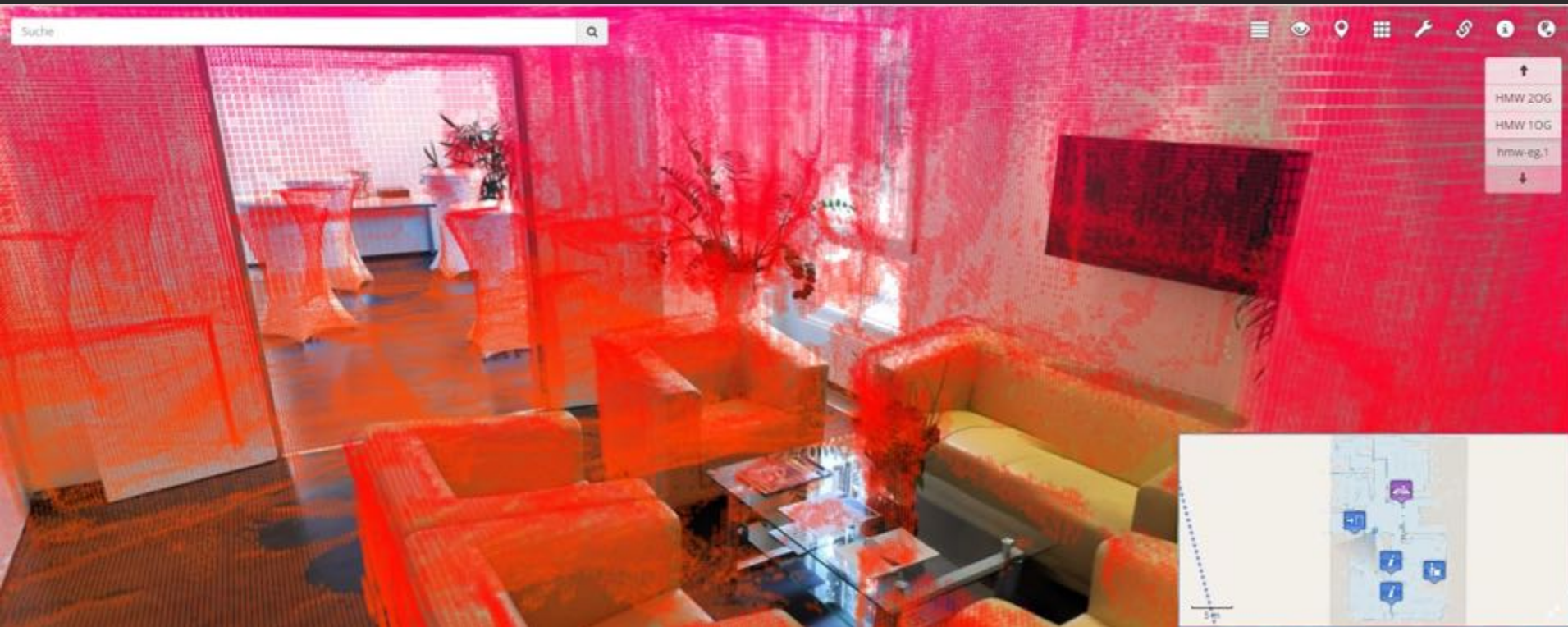


Your benefit

- Promote highlights by creating Points of Interest
- Provide additional information like pictures, information or interactive content
- Inspire the customer and share the emotions

The technology

- Intuitive user interfaces allows the creation of POIs with just a few clicks
- HTML5 technology offers the full flexibility in the design of POIs
- Navigate or jump directly to POIs

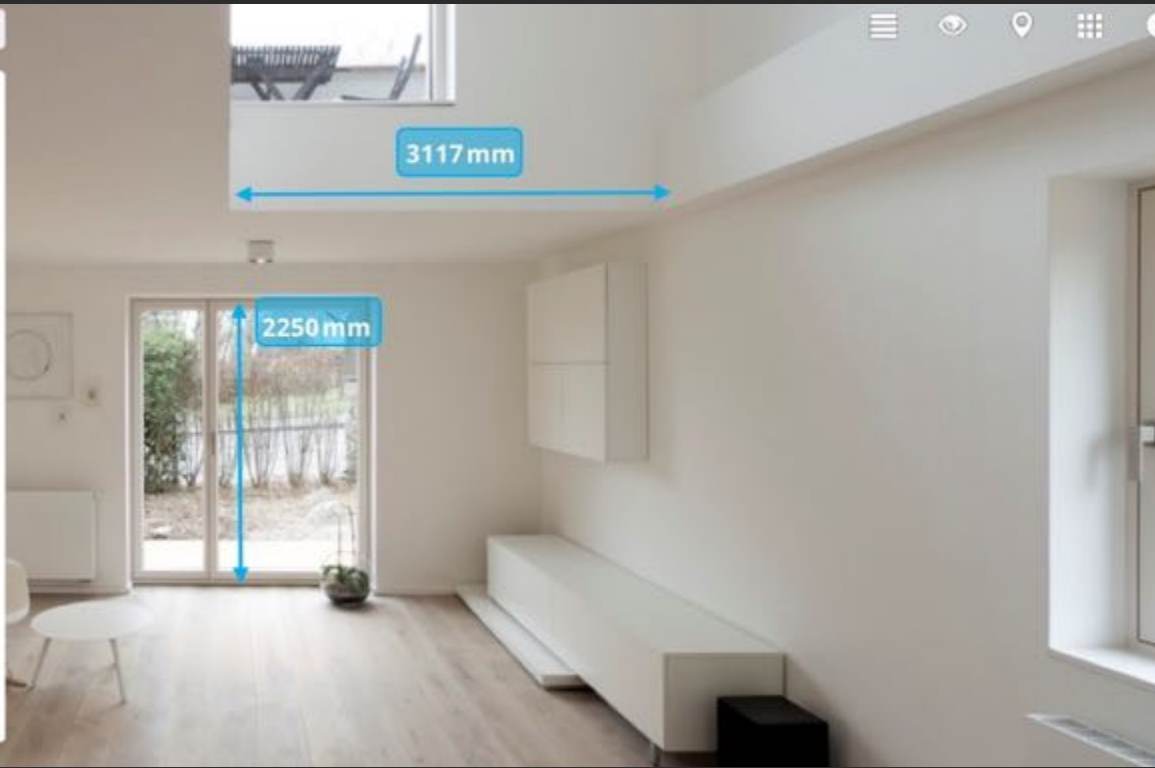
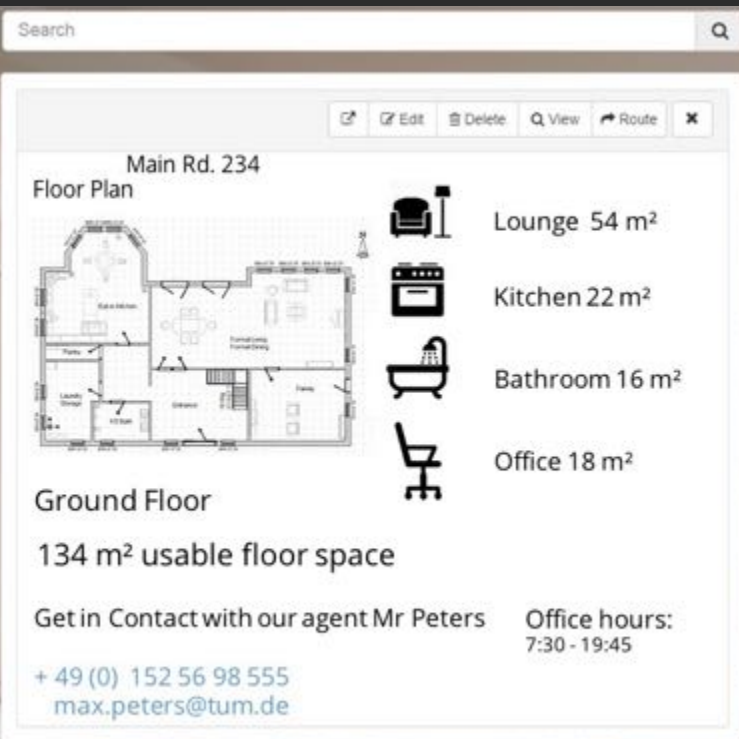


Your benefit

- Take measurements quicker and more precisely than ever before
- Plan the suitability of furniture, kitchen etc.
- Floor plans of every level available

The technology

- Inch-perfect laser measurements are combined with high-resolution panoramic images
- Jump into the different rooms via POIs
- HTML5 offers full access on every device – right in your browser without additional software required



Your benefit

- Preview, present and sell visions or ideas to the customer
- Provides an inch-perfect virtual model for Designers and Interior Architects to work with

The technology

- Activate the point cloud overlay to experience the 3D model of the object
- High accuracy floor plans are generated in the post processing



Object valuation

Measure and record existing and potential objects in high-precision and in highest definition



Risk assessment

Evaluate risks of your objects continuously while taking all relevant information into account



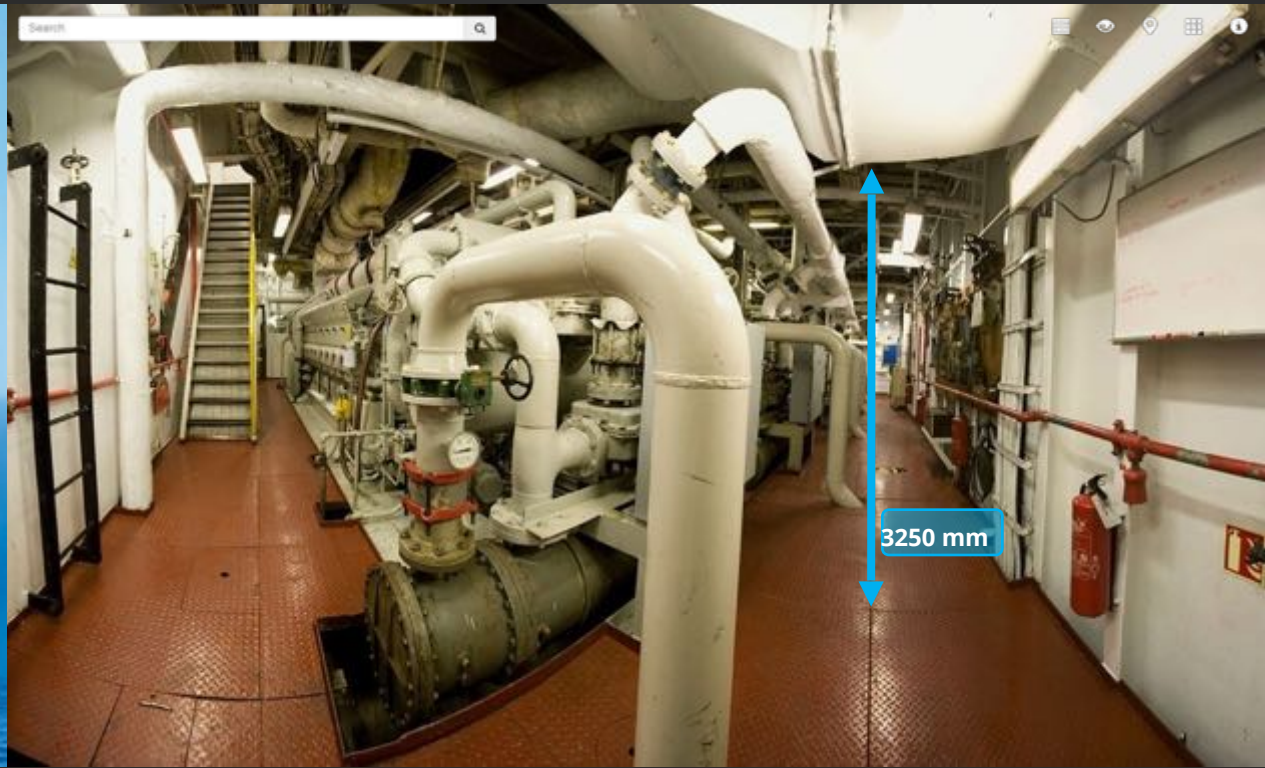
Risk prevention

Identify and eliminate potential risks: Help your customers improve safety



Customer care

Attend and advise your customers thoroughly and efficiently in case of claims

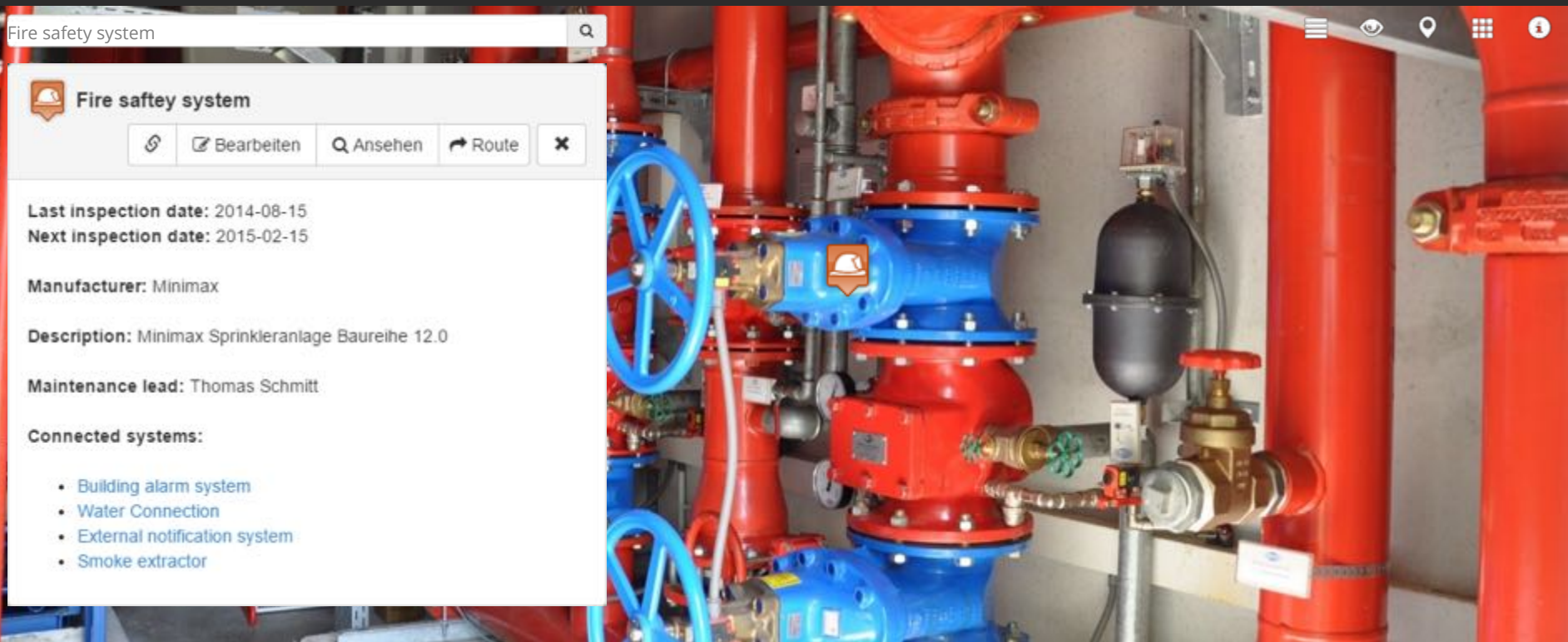


Your benefit

- Eliminates biases and distortions
- Reduces cost through efficient and inexpensive data recording
- Simplifies object valuation particularly for objects difficult to access

The technology

- Photo-realistic and inch-perfect capturing of your objects by the NavVis M3 Trolley
- Press play – foolproof operation of the hardware for recording your data
- Access from any browser anywhere in the world – no need for additional software or plug-ins

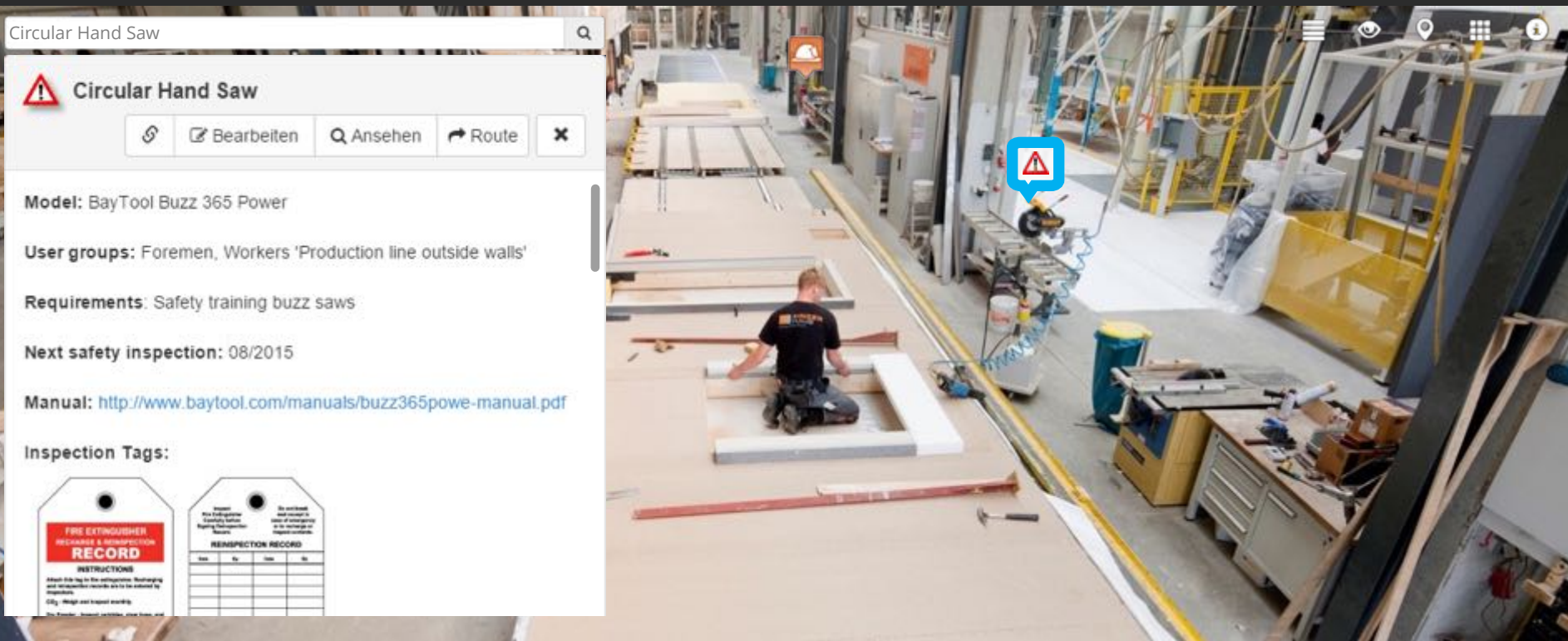


Your benefit

- Independence from time zones – experts all over the world evaluate around-the-clock
- Objectivity and completeness of information for your data warehouse
- Pay as you maintain: telematics-driven rates for your buildings and assets

The technology

- Optimal connection to your IT systems through open APIs
- Information and comments to individual assets
- Automated data processing and preparation on your own servers

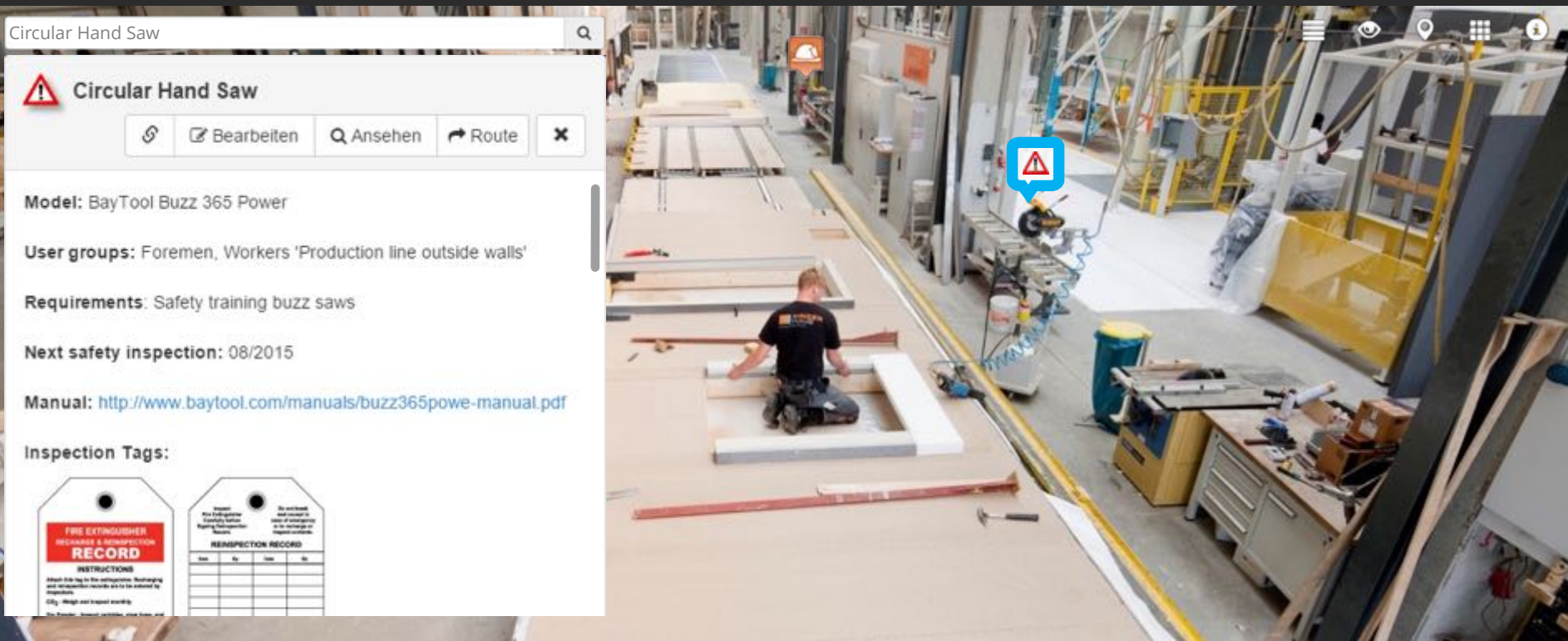


Your benefit

- Tagging and marking of peril points within the IndoorViewer
- Documentation of peril points before and after countermeasures
- Information sharing with your customers – incentives for safety improvements

The technology

- Relevant points of interest – inserted with a fast and simple click into the 3D model
- Dedicated access to your data for customers – simply in any browser

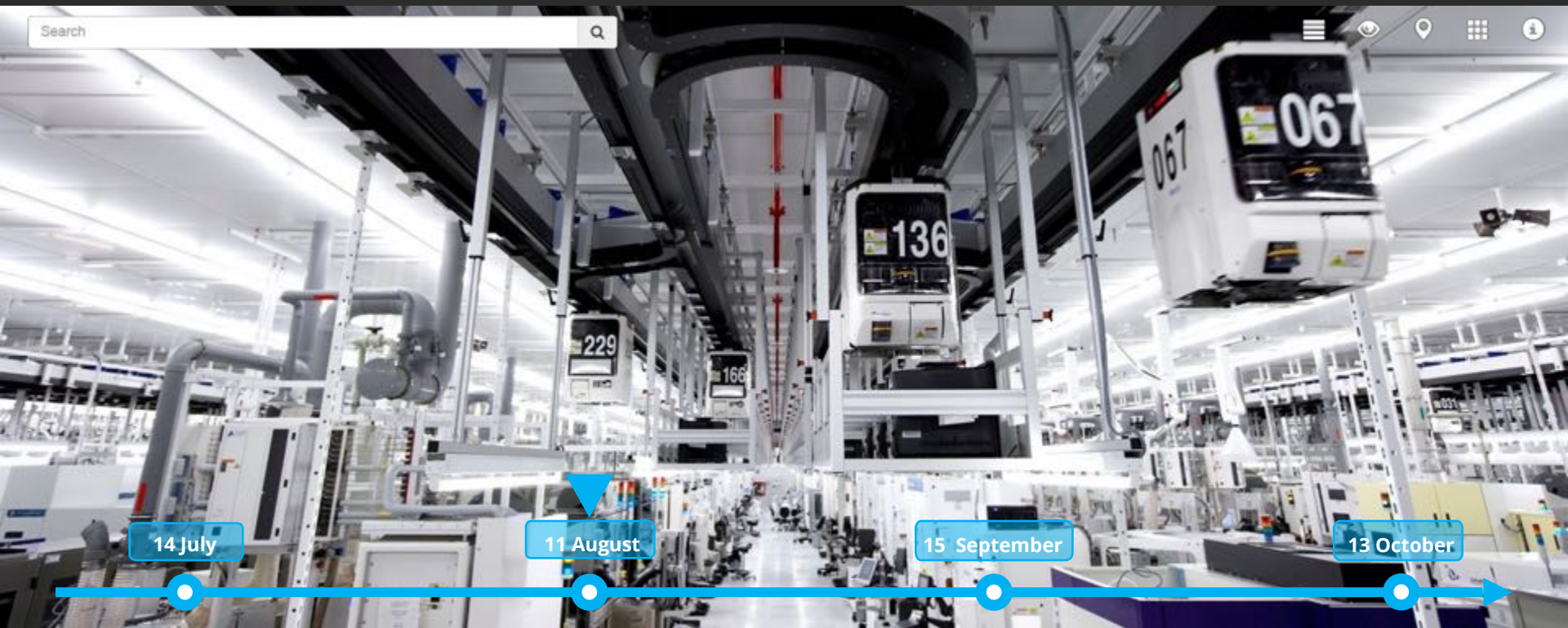


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Your benefit

- Increased transparency through complete illustration of current state and historic states
- Complete information through ex post observation – even in the case of unforeseen events and aspects
- Optimized processing of claims – faster and more efficient

The technology

- IndoorViewer powered by HTML5 available on desktop, tablet, smartphone
- Finds single objects quickly and simply through built-in full-text search



Documentation

Document as is status in production facilities and globally share best practices



Repair & maintenance

Reduce stand still times, reduce repair and maintenance cost through better preparation, routing and documentation



Continuous improvement

Digitally capture the continuous change and improvement on the production floor. Make improvements traceable.



Logistics

Provide location context to external partners and optimize the flow of work and material

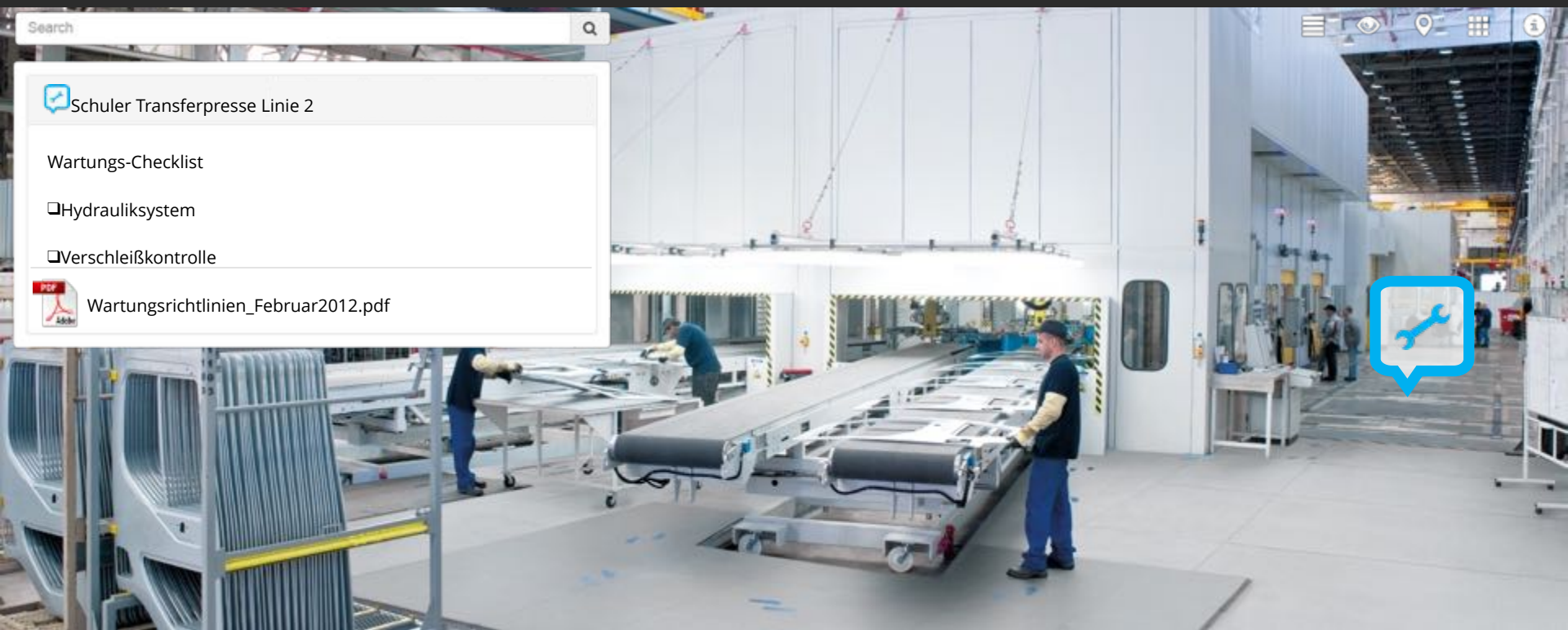


Your benefit

- Capture current production setup fast, cost efficient and in all geometric and visual detail
- Allow for virtual visits and invite remote experts to help capture improvement potentials
- Share „real“ best practice examples globally

The technology

- Combination of laser scanner and high resolution imagery allows for photorealistic virtualization
- Capture up to 50.000 m2 per day
- Capturing can be done by own people on the ground



Your benefit

- Save time and cost through repair & maintenance remote preparation / digital look around
- Save time and cost through way finding (especially with external partners) and on site activity tracking
- Ensure correct execution through digital documentation at the object

The technology

- Add repair / maintenance virtual „ticket“ directly at the object
- Full text search and routing to any repair ticket
- High resolution and measurement function for optimal preparation of a repair / maintenance job

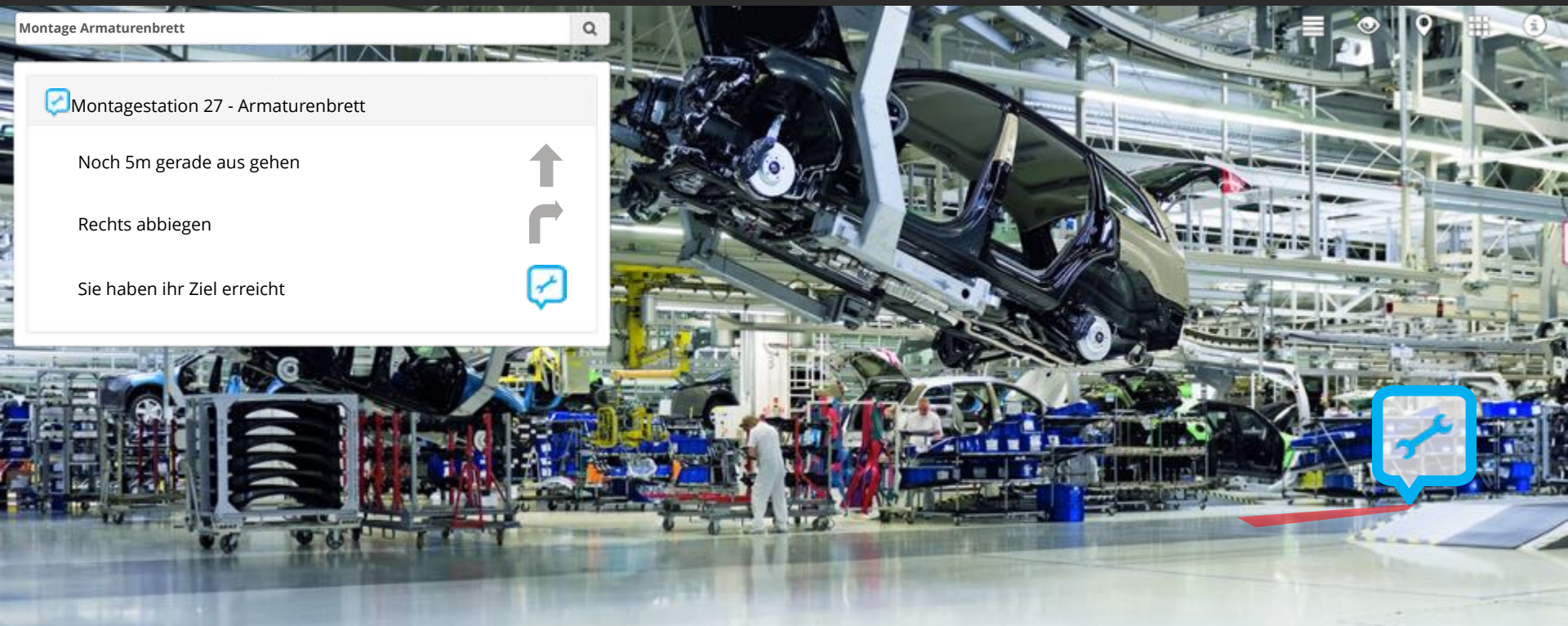


Your benefit

- Document change and keep track on implementation of planned measures
- Use virtual collaboration to work on process and layout improvements
- Reduce ramp up times for new staff or external people

The technology

- Map premises regularly and with own staff in order to achieve minimal cost and gain up to date data
- Keep all rights to your data
- Host data on your premise if required or use NavVis secure cloud



Your benefit

- Use highly detailed and easy to understand 3D data or 2D overviews – no plan but as is data
- Use 3D routing function to plan and execute punctual logistic indoors

The technology

- Maximize ability to recall the online experience on the ground through photorealistic 3D data
- Can be combined with turn-by-turn indoor navigation app (see chapter mobile)



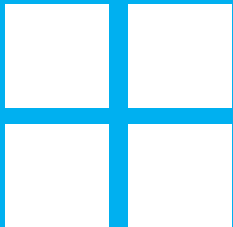
Market



Product



Customer Value



Business Model



Company

Digital indoor today

Expensive

€ 3 per m²

Slow

Usually more than a month to get data

Only experts

Point cloud or CAD software hard to use

Not open

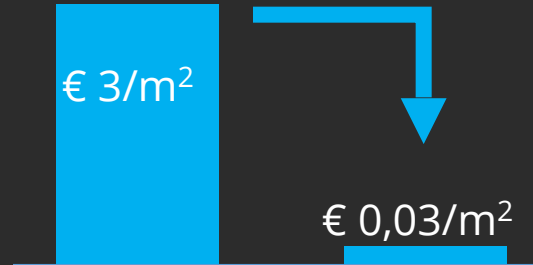
No open APIs, not web based

No position

Not helpful for field workers

NavVis digital indoor tech is game changing

Low cost



Cutting mapping cost
by factor 100

Fast



Data next day

For all

Browser based. No plugins. Everyone, any device.

Open

HTML 5. Open APIs. Deep virtual HTML links.

Positioning

NavVis App: Vision based. Meter accurate. No hardware.



Higher profits

- Exciting shopping experience through online-offline convergence
- Multiply your offline retail space online
- Increase your appeal with an online shopping world instead of catalogue-shops
- Precise targeting using real-time marketing, A/B-Testing etc.



Lower costs

- Efficient processes, made possible by offsite-inspections
- Lower knowledge of the place necessary, therefore better pooling of human resources possible
- Holistic building and plant documentation at lowest costs



Market



Product



Customer Value

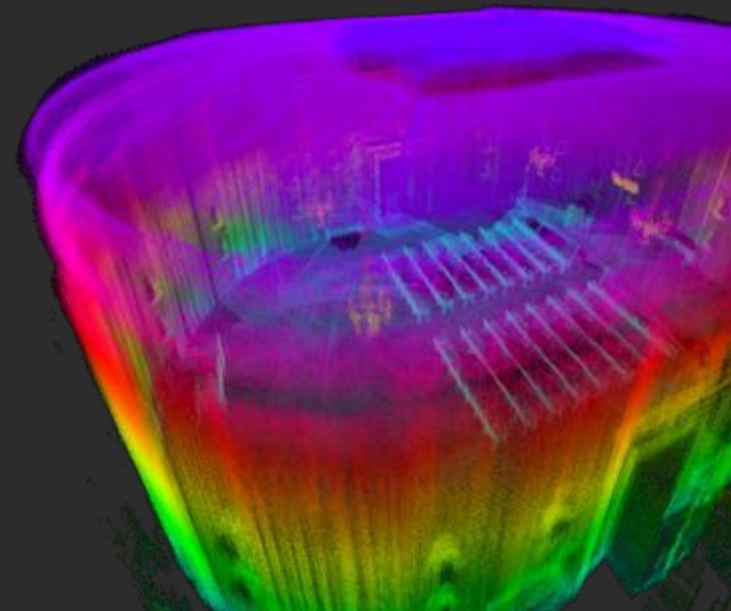


Business Model



Company

- ✓ Located in Munich, Spin-off from TU Munich, VC backed since Q3 2014
- ✓ Patented tech; >7 years of public funded research (>150 man years of R&D), >10 PhD theses, >40 master theses, >35 peer reviewed publications, ...
- ✓ Market entry Q4 2014, gained top industry leaders as customers by Q3 2015
- ✓ Started build out of international partner network to >15 today
- ✓ Forged first strategic partnerships with key players inc. Esri, Intershop, Siemens, ...
- ✓ High profile team of >60
- ✓ Backgrounds from top international research / business institutions (incl. Stanford, Harvard, LSE, St. Gallen, UCLA, Microsoft, HP, McKinsey)



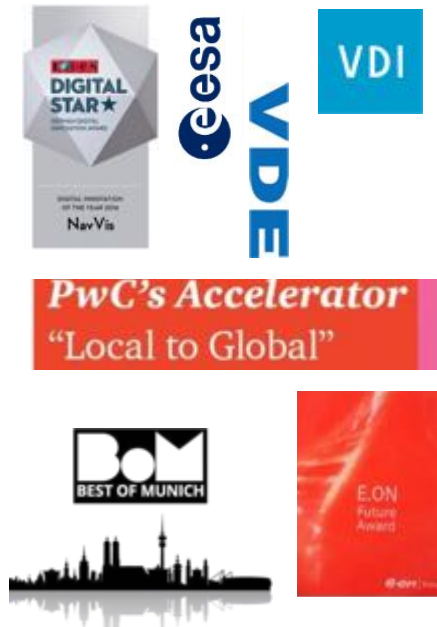
Backers, Awards & Media

NavVis

Backed by renowned venture funds and industry leaders



Honored by multiple prestigious awards



Featured by national and international media



The Founders



Sebastian Hilsenbeck

- Head of mobile development
- Years of experience in computer vision, data fusion
- Master of science Georgia Tech (second degree, 2010)
- VDE-Award 2012 for master thesis on computer vision

Dr. Georg Schroth

- CTO
- Started project NAVVIS
- Honors Degree in Technology Management (CDTM)
- Visiting Researcher at Stanford (2007, 2010)
- E.ON future award (2009), Rohde-, Muehlfehl-, Carl-Duisburg scholar, VDI award

Dr. Felix Reinshagen

- CEO
- Junior Partner McKinsey – High Tech & technology (NY, Palo Alto, Munich)
- PhD in economics (HSG Switzerland); computer science / economics (KIT)
- 10 years' experience in software development
- Awarded a McKinsey MARVIN (2012), Young Leader of Atlantikbrücke (2012)

Robert Huitl

- Chief architect and head of web development
- Visiting researcher UCSB
- Kurt-Fischer-Award for master thesis on computer vision
- Tremendous experience on all levels of software engineering





Digitizing the indoors

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